



CITY OF WAUKON, IOWA

REPORT OF INDEPENDENT ROADWAY INSPECTION

By VEENSTRA & KIMM, INC.

PROJECT LOCATION

3RD ST. FROM MAIN AVE. TO 6TH AVE.

2013 STREET IMPROVEMENT PROJECT

REPORT FOR

INDEPENDENT ROADWAY INSPECTION OF THE 2013 STREET IMPROVEMENT PROJECT – WAUKON, IOWA

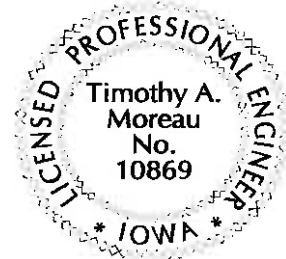
I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signed:  Date: 9/11/14

Timothy A. Moreau, P.E.


Iowa License No. 10869

My license renewal date is December 31, 2015



Certification

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signed:  Date: 9/11/2014

Andrew J. Smith, P.E., P.L.S.

Iowa License No. 14233

My license renewal date is December 31, 2015

Detailed parts covered by these seals



All Parts

Prepared by
VEENSTRA & KIMM, INC.

Mason City, Iowa

GENERAL BACKGROUND

This Project was Let in the Spring of 2013 with construction beginning the summer of 2013. Construction of underground and rough grading was performed in 2013 with paving being completed the summer of 2014. The new roadway section consists of a 25' wide back to back of curb, 7" thick Portland Cement Concrete (PCC) pavement with cross-slopes of 2% and longitudinal grades between 0.49% and 8.46%. Overall the new pavement is in excellent condition and was well constructed.

Some areas of the original street were more of a rural street section which means there wasn't a curb and gutter and the pavement drained to the side of the road and across private properties. The new street was designed as an urban street section meaning full curb and gutter (excluding driveway drops) on both sides of the road.

During construction in 2014 there was a significant rainfall event in which several potential drainage issues were noted along the project route. It is important to note that construction was incomplete at the time of this storm and there were erosion control measures in place that affected how runoff would be handled under normal rainfall events.

Many of the issues discussed in this report are based on City and property owner input that was observed during the previously mentioned rainfall event.

Veenstra & Kimm, Inc. was hired by the City of Waukon on August 26, 2014 to provide an independent roadway inspection of the 2013 Street Improvement Project. This project is located along 3rd St. NE from E. Main St. to 6th Ave. NE in Waukon, Iowa and was designed by TeKippe Engineering, a Division of Fehr Graham.

Veenstra & Kimm, Inc. visited the site and performed field reconnaissance on September 4, 2014. Plans and Specifications for the project were made available at City Hall that day. In addition, photos and video clips were provided by City staff and property owner Ray Burroughs.

Typically with any new street and storm sewer design, the street and storm sewer are designed to handle a specific minor rainfall recurrence interval or rainfall frequency. Typically this rainfall recurrence interval is a 5-year recurrence interval. For major rainfall recurrence intervals such as a 100-year recurrence interval, there are no specific designs to handle this storm event except for providing some overland route. Most of the time the overland route is not defined or designed. The main reason streets and storm sewers are designed for a minor storm event is typically due to economics and the fact that anything beyond a minor storm event design is very costly.

SCOPE OF REPORT

In accordance with Veenstra & Kimm, Inc.'s letter Proposal/Agreement dated August 4, 2014, this report includes:

- (A) Identify / quantify / locate the nature of the drainage problems
- (B) Offer an opinion regarding the adequacy of the design as it pertains to drainage
- (C) Determine if the improvements had been constructed in accordance with the Plans and Specifications.
- (D) Offer recommendations for corrective action as may be needed.
- (E) Provide a preliminary opinion of probable cost for implementing the corrective actions recommended.

ITEMS OF CONCERN

Based on discussions with Street Superintendent Randy Murphy, Mayor Loren Beneke, City Councilman Steve Wiedner and several property owners along 3rd St. NE including former Mayor Keith Schroeder, Ray Burroughs and Diane Ward, it is understood the general items of concern include inefficient intakes, storm water leaves the street and flows down the sidewalk in certain areas, and basements are now having water seep into them.

The following specific items of concerns have been raised and identified by these individuals:

- (1) Intakes are not efficient in collecting water at the NE corner of 2nd Ave. NE and 3rd St. NE and water ponds in the street.
- (2) Water runs down the driveway at 206 3rd St. NE, enters the garage and gets into the basement.
- (3) Water leaves the roadway at the SW corner of the intersection of 3rd Ave. NE and 3rd St. NE and flows down the west sidewalk.
- (4) Water leaves the roadway and comes onto property at 304 3rd St. NE and seeps into the basement.
- (5) Water leaves the roadway and flows down the driveway and into the garage at 411 3rd St. NE.
- (6) Water is not draining properly at the intersection of 5th Ave. NE and 3rd St. NE and the road was built higher than designed and is now causing water to seep into the basement at 209 5th Ave. NE.
- (7) Debris is getting into the newly constructed subdrain system and is plugging at the subdrain outlets.

FIELD RECONNAISSANCE

Veenstra & Kimm, Inc. spent most of one day on site visually reviewing the completed project, taking only a few survey shots for elevations, and reviewing potential issues / concerns / problems with City staff and adjacent property owners.

City staff opened up the fire hydrant at the intersection of 3rd Ave. and 3rd St. to see how changes in the sidewalk and driveway at the SW corner of this intersection would affect water flow. See Photo #1 below.

PHOTO #1



The water was also directed down the east gutter line and flowed to the NE corner of the intersection of 2nd Ave. and 3rd St. so that we could see how the intakes at this location functioned. See Photo #2 & #3 on the next page.

PHOTO #2



Veenstra & Kimm, Inc. took a few shots on newly constructed / adjusted manholes for a comparison in elevation to the original design. Based on field observations and the survey shots taken it is Veenstra & Kimm, Inc.'s opinion that the roadway improvements were indeed constructed generally in accordance with the plans prepared by Fehr Graham.

Veenstra & Kimm, Inc. contacted Lyle TeKippe, Fehr Graham and discussed many of the design considerations / aspects of this project as well as the concerns of City staff and property owners. He advised that there were many unique circumstances with this project and that the design had to take all these unique circumstances into consideration and there had to be some "give and take" as compared to what would have been done in a more typical situation. Items he had to take into consideration that affected the overall design were 1) tree removal was to be minimized; 2) cover over water main was not to be reduced to avoid freezing; 3) avoid steep driveway approaches; 4) provide adequate drainage as can be handled by the existing storm sewer system without overloading it; 5) the street right-of-way (ROW) is narrower than normal; and 6) street widths were to be narrower than normal.

PHOTO #3



FINDINGS & RECOMMENDATIONS

Regarding the various Items of Concern identified in the section "Items of Concern", Veenstra & Kimm, Inc. offers the following findings & recommendations as applicable:

Veenstra & Kimm, Inc. identified seven (7) perceived drainage problems. These problem areas or areas of concern include:

Concern #1: Intakes are not efficient in collecting water at the NE corner of 2nd Ave. NE and 3rd St. NE and water ponds in the street.

PHOTO #4



Findings: Much of the water runs past the intakes and ponds in this area. See Photos #1 and #2 under "Field Reconnaissance".

Recommendations: The boxouts (pavement area in front of and to the sides of the intake) should be reconstructed to create more of a throat to channel water into the intake. Along with reconstructing the boxouts, some grinding of the pavement should be done from the lowest point of the ponding area to the edge of the reconstructed boxout.

Estimated Cost: Pavement Boxout reconstruction	\$1,500
<u>Grinding</u>	<u>\$ 800</u>
TOTAL	\$2,300

Concern #2: Water runs down the driveway at 206 3rd St. NE, enters the garage and gets into the basement.

PHOTO #5



Findings: It is claimed that water is leaving the roadway and draining onto and down the west sidewalk and then down this driveway and getting into the garage and into the basement. This problem was occurring during construction and since the time of the observation of the water getting into the garage and basement the hump in the driveway as seen at the back of the sidewalk was constructed and the intake seen on the north side of the driveway was constructed. It appears that this “fix” may be sufficient to keep water from the street right-of-way from continuing to go down the driveway.

However, it is to be noted that the original driveway had always been draining towards the garage so there may always be a certain amount of water getting into the garage.

Part of the problem at this location is also addressed with Concern (3) on page 7 as far as the source of the water going down the sidewalk and into the garage.

Recommendation: No further action is recommended at this time. However, it is recommended that this particular area be observed during future rain events to see if the already constructed fixes are working properly. If not, further action may be necessary and can be considered at that time.

Estimated Cost: \$0 (at this time)

Concern #3: Water leaves the roadway at the SW corner of the intersection of 3rd Ave. NE and 3rd St. NE and flows down the west sidewalk.

PHOTO #6

Findings: It is claimed that water is coming across the intersection from the north and going down the west sidewalk rather than staying in the street. This is causing most of the problems experienced in Concern (2) on the previous page. Again this problem occurred during construction and since the time of the rain event and



water going down the sidewalk, the driveway apron and ADA ramps were reconstructed to provide the equivalent of a 6" curb to attempt to keep water in the street rather than running down the sidewalk. See Photo #1 under "Field Reconnaissance". This reconstruction of the ADA ramps appears to have worked as well based on the observation from the fire hydrant flooding discussed in the "Field Reconnaissance" section.

In addition, Fehr Graham has also indicated that they were considering reconstructing a portion of the newly constructed side-street pavement to create more of a gutter line through the intersection from north to south to better divert/channel water through this intersection.

Recommendation: No further action is recommended at this time. However, it is recommended this area be observed during future rain events and if water is observed to leave the street and run down the sidewalk, the reconstruction of the west gutter line or possibly other corrective actions be performed at that time.

Estimated Cost: \$0 (at this time)
 To Be Determined (with reconstructing a portion of side-street pavement in future or other corrective action)

Concern #4: Water leaves the roadway and comes onto property at 304 3rd St. NE and seeps into the basement.

PHOTO #7



Findings: It is claimed that water is coming off of the street and down the driveway located north of House #304 then flows down the sidewalk and onto property at #304 and is reportedly seeping into the basement.

Fehr Graham has indicated they were considering reconstructing the driveway apron for house #306 to essentially create a 6" curb to prevent water from leaving the street.

Recommendations: Veenstra & Kimm, Inc. agrees with performing this work although it will create a less than desirable driving situation along the southern most portion of the driveway. However, since this is a low speed situation it is recognized this should be manageable.

Estimated Cost: \$1,700

Concern #5: Water leaves the roadway and flows down the driveway and into the garage at 411 3rd St. NE.

PHOTO #8

Findings: It is claimed that after construction, water is now flowing down the driveway and into the garage to house #411. After visiting this location and reviewing the plans and cross-sections in this area, it appears that the street right-of-way had drained towards house #411 prior to construction and continues to drain this way after construction. An intake has



been constructed in what appears to be a low point in the front yard of house #411 just to the north of the driveway. See Photo #9.

PHOTO #9



Recommendations: No further action is recommended.

Estimated Cost: \$0

Concern #6: Water is not draining properly at the intersection of 5th Ave. NE and 3rd St. NE and the road was built higher than designed and is now causing water to seep into the basement at 209 5th Ave. NE.

PHOTO #10



PHOTO #11

Findings: The intake at the SW corner of the intersection of 5th Ave. and 3rd St. was removed and not replaced. It is claimed that water is now getting into the basement of house #209 5th Ave. and water now stands in the gutters of 5th Ave. because the elevation of the road was raised and the intake was not replaced.



It was determined that the road was not raised in this area other than backfilling behind the new curb that was constructed on the west side of 3rd St. going south of this intersection where there was no curb before. In fact this intersection was constructed slightly lower than before to allow water to drain across the intersection to the new intersection on the east side. See Photo #12.

PHOTO #12



It is Veenstra & Kimm, Inc.'s opinion that the project did not cause water to get into the basement of house #209 5th Ave.

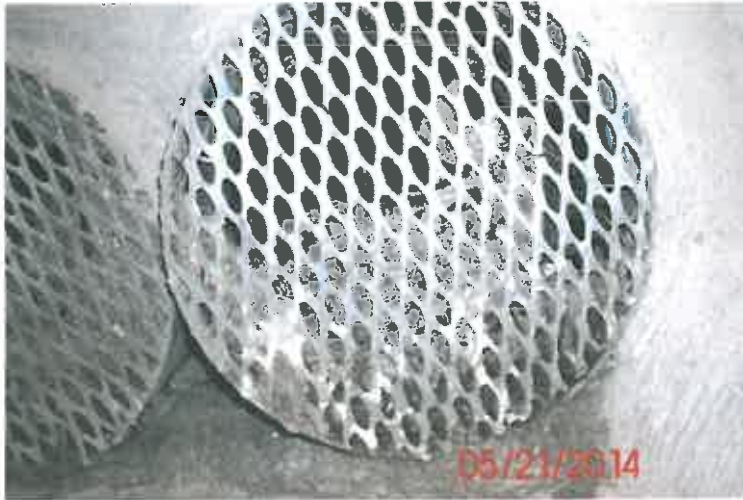
Regarding water along the edges of the roadway as shown in Photo #11 on the previous page, it appears that the water in the south gutter line is ponding due to conditions that existed prior to construction outside the project area and is not caused due to construction. It is Veenstra & Kimm, Inc.'s opinion that the water shown in the north gutter line is simply spreading and not ponding due to flatter areas in the pavement.

Recommendations: It is Veenstra & Kimm, Inc.'s recommendation that a pair of intakes be installed, one at the SW corner and one at the NW corner of this intersection, and tied into the subdrain tiles currently going across the road to the intake on the east side of the intersection.

Estimated Cost: \$4,500

Concern #7: Debris is getting into the newly constructed subdrain system and is plugging at the subdrain outlets.

PHOTO #13



Findings: The above photo was provided to Veenstra & Kimm, Inc. by one of the property owners. As you will note, there is some debris behind the rodent guard of one of the subdrain tile.

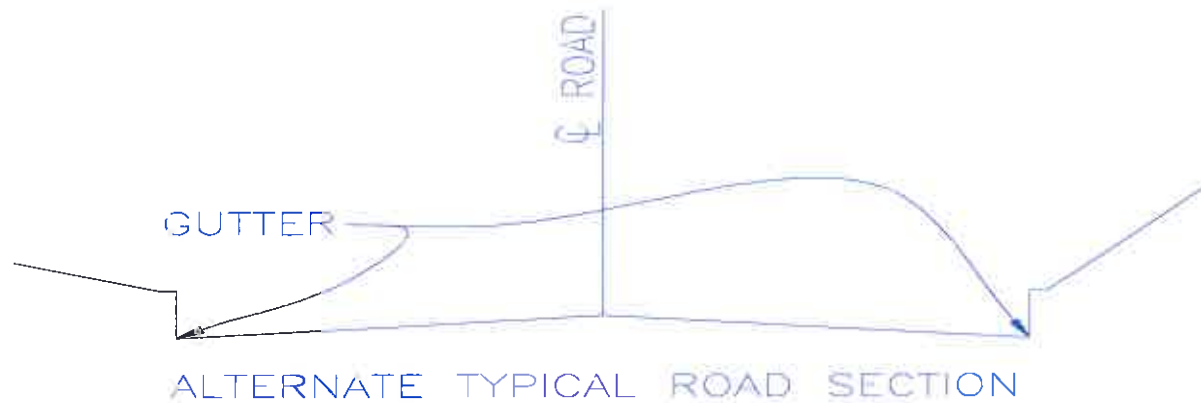
Recommendations: It is recommended this be cleaned out and all subdrain lines connected to a surface drain be checked. If subdrains that has a surface intake connected to it and continues to be blocked with debris, it is recommended that the rodent guard be removed.

Estimated Cost: \$200

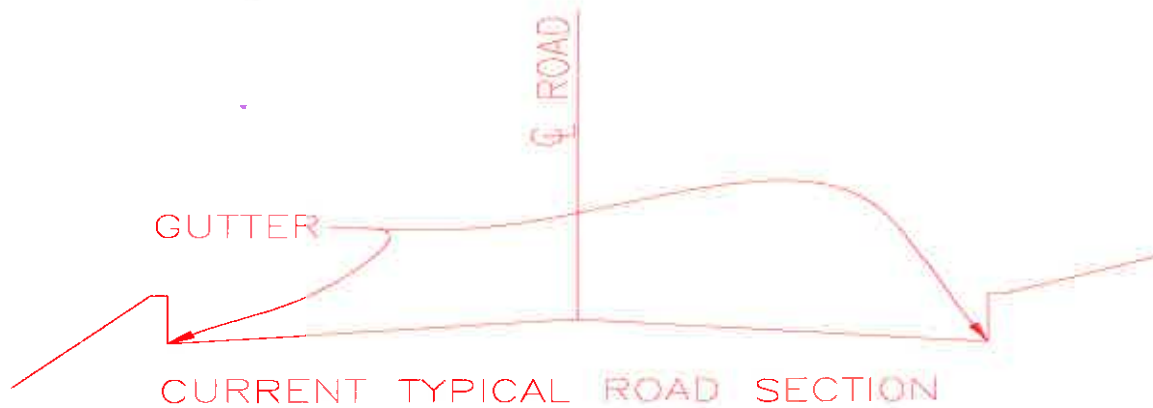
OPINION REGARDING ADEQUACY OF DESIGN AS IT PERTAINS TO DRAINAGE

Veenstra & Kimm, Inc. reviewed the design of this street project, specifically as it pertains to the claimed drainage issues / concerns identified. Veenstra & Kimm, Inc. is of the opinion there are at least two other possible alternate design concepts that may have been used in this particular project. Keep in mind this is a fairly unique project in that the right-of-way (ROW) width is considerably narrower than most (49.5' vs. 66'). Also, it is understood that the property owners desired to have a narrower than normal pavement width (25' vs. 31').

One alternate design concept Veenstra & Kimm, Inc. considered was utilizing the actual designed roadway cross-section as-is, but simply lowering the street where necessary so all of the road ROW would drain to the street. This is your typical and most desirable design concept, when/where possible. Lowering the street is an alternate design that several citizens and council members believe could have and should have been used to avoid the drainage concerns. See the "ALTERNATE TYPICAL ROAD SECTION" below.

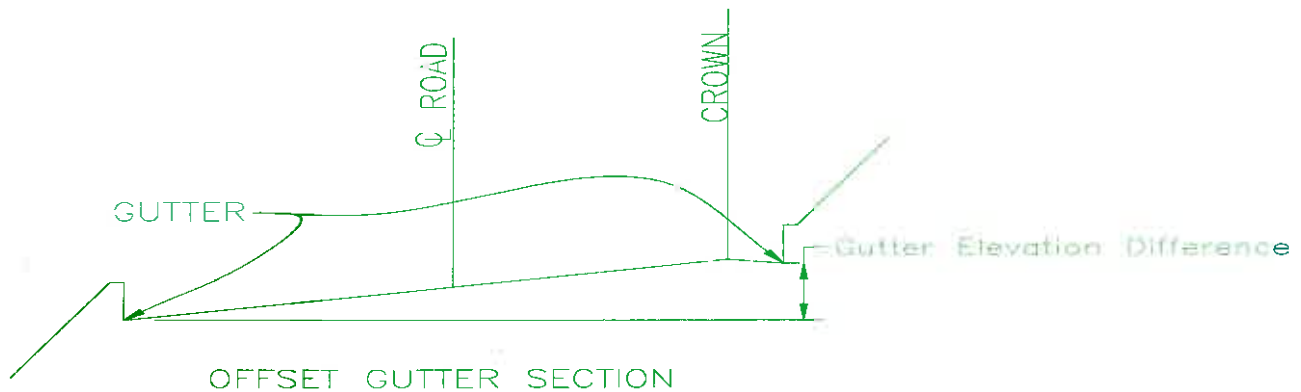


This project as designed and as constructed has the following as the Typical Road Section. Note the slopes behind the curb and gutter:



However, when considering the alternate design concept (i.e. lowering the street), other undesirable issues likely would have resulted. These undesirable issues consist of several driveways on the east side would have been excessively steep; additional trees would have had to be removed; cover over the existing water main may have been reduced; and in some locations retaining walls likely would need to have been constructed adjacent to the ROW line.

The second design concept Veenstra & Kimm, Inc. considered was the idea of having offset gutter lines, much as the original street had. See the "OFFSET GUTTER SECTION" below. With this concept, for most of this project the east gutter line would have been higher than the west gutter line. Typically the crown of the road would be at the centerline of the road but for this concept it would need to be shifted to the higher side of the road to allow for an adequate gutter elevation difference from one side of the road to the other so that you could avoid excessively steep cross-slopes as the existing roadway appeared to have before on the southbound lane.



Again, as with the previous alternate, when considering this alternate other undesirable issues arose. These undesirable issues consist of how the road would ride; potential for drainage to sheet across the roadway causing ice issues in the winter; the carrying capacity of the higher gutter area is greatly reduced; and transitioning issues between this section and other sections or at intersections. In addition, some cutting or lowering of the existing grade would be required on the west side in some areas, thus reducing cover over the existing water main.

Although other design concepts may have been used, it can end up being a matter of one engineer's opinion vs. another's. As long as drainage is addressed appropriately, there could always be other alternate design concepts used. In addition, when comparing alternate design concepts it often boils down to weighing pros and cons of each design concept and making compromises to best fit existing situations.

Thus, it is Veenstra & Kimm, Inc.'s opinion that the design concepts used by Fehr Graham for this project appear to be adequate and were appropriate for these specific circumstances.

DETERMINING IF IMPROVEMENTS WERE CONSTRUCTED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS

Veenstra & Kimm, Inc.'s field reconnaissance consisted of visual observations as well as limited elevation shots. Veenstra & Kimm, Inc. did note that there were a few changes between what was constructed vs. what was designed. The only changes Veenstra & Kimm, Inc. noted that would have affected overall performance of what was intended with the design was location of a few intakes, which appear to have been relocated to better collect water at more key locations.

Ultimately, it was determined from this information that the overall project had generally been constructed in accordance with the plans and the elevation of the pavement is within an acceptable tolerance of the design elevations.

CONCLUSION

Although there are a few localized areas that may have had drainage issues, it is Veenstra & Kimm, Inc.'s opinion that the design concepts used by Fehr Graham for this project appear to be adequate and were appropriate for these specific circumstances.

It is Veenstra & Kimm, Inc.'s opinion that the overall project has generally been constructed in accordance with the plans and the elevation of the pavement is within an acceptable tolerance of the design elevations.

It is recommended to perform the suggested corrective actions and observe and document these and the previous fixes during future rain events (both minor and major storm events) and re-visit these issues in the near future. It is suggested that video be taken during rain events to document how water is being diverted / channeled through the new construction.