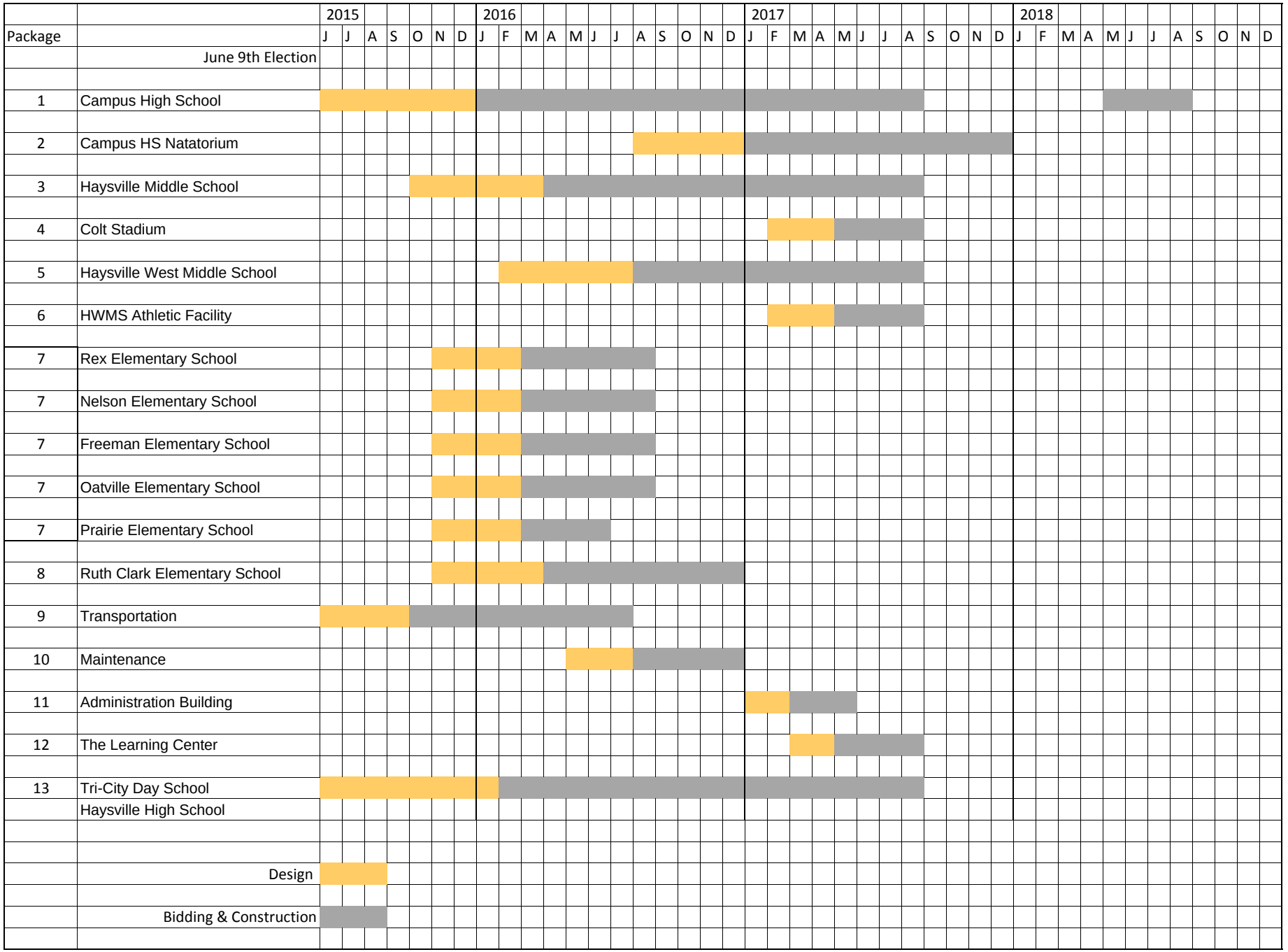
HAYSVILLE USD 261

Preliminary Project Timeline **7.06.15**



HAYSVILLE USD 261

BOND PROJECTS

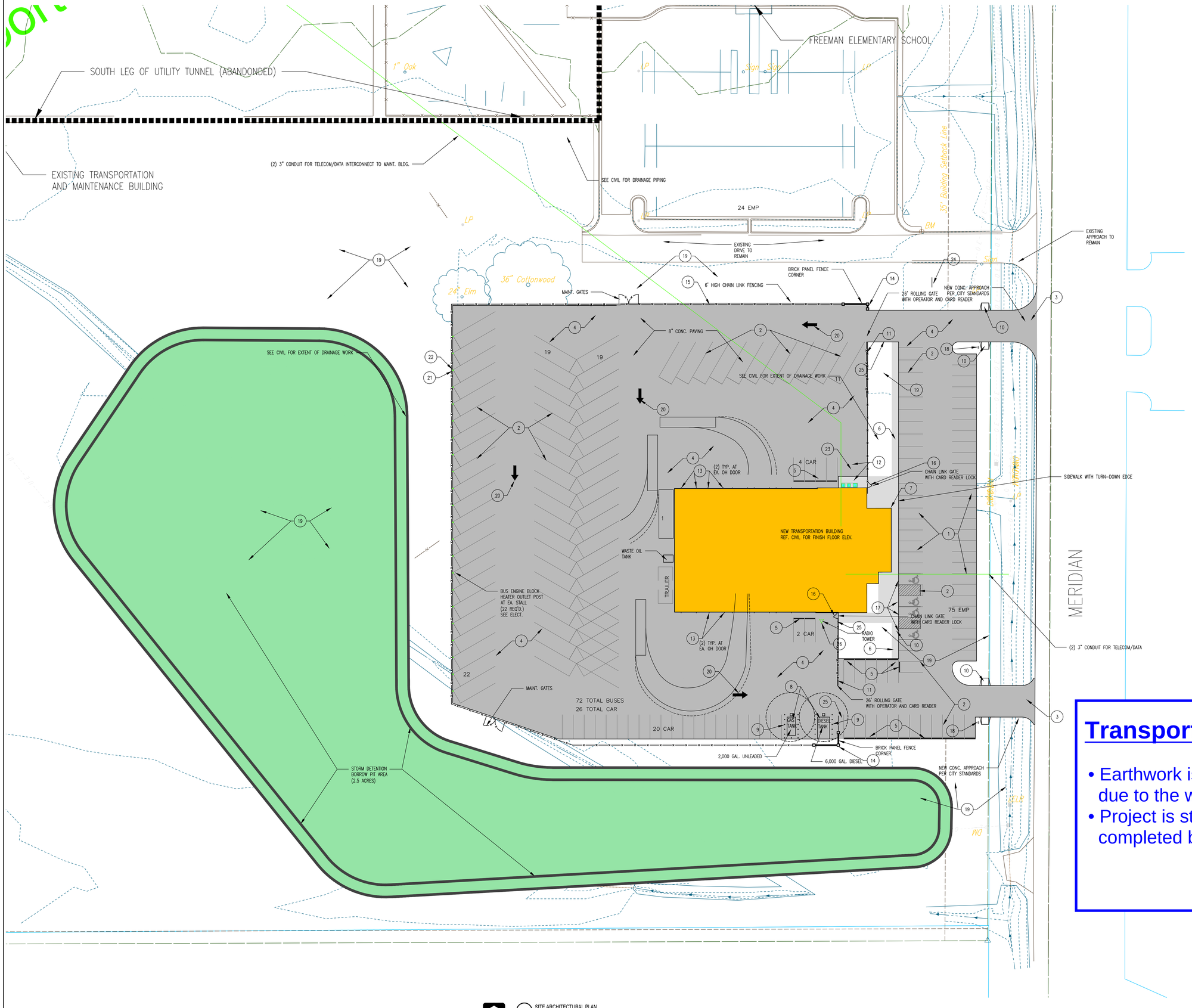
- TRANSPORTATION
- CAMPUS HIGH SCHOOL
- HHS / TRI-CITY SCHOOL
- HAYSVILLE MIDDLE SCHOOL

THE ARCHITECT HAS REVIEWED THE FOLLOWING INFORMATION WITH THE USD 261 FACILITY REVIEW COMMITTEE

USD 261 HAYSVILLE SCHOOLS

JAN. 25, 2016

HOWARD+HELMER architecture



1 SITE ARCHITECTURAL PLAN
1"=30'-0"

SITE PLAN LEGEND

- CONCRETE
- ASPHALT
- 6'-0" SECURITY FENCE
- PETROLEUM OR NATURAL GAS PIPE LINE
- EASEMENT LINE

GENERAL NOTES

1. G.C. IS RESPONSIBLE FOR SURVEYING EXISTING SITE CONDITIONS AND NOTIFYING ARCHITECT OF ANY DISCREPANCIES.
2. UNLESS NOTED OTHERWISE, DIMENSIONS ARE TO FACE OF CURB, FACE OF WALL, AND EDGE OR CONCRETE WORK (TYP.).
3. BACKFILL W/TOPSOIL (6" MIN.) TO WITHIN 1/2" OF TOP OF SIDEWALKS AND CURBS WITHIN LIMITS OF CONSTRUCTION.
4. DO NOT DISTURB SITE BENCH MARKS.
5. REF. CIVIL, MECH, AND ELEC. FOR COORDINATION OF UTILITIES.
6. REF. CIVIL FOR LIMITS OF CONSTRUCTION.
7. STRIP AND STOCKPILE 6" OF TOPSOIL TO BE USED IN LANDSCAPE AREAS.

CONSTRUCTION PLAN NOTES

1. BASE BID ASPHALT PAVING, REF. 6/SA-1.2. CONCRETE PAVING BID ALT. #2. SEE CIVIL.
2. PAVEMENT MARKING, SEE CIVIL.
3. CONCRETE APPROACH, SEE CIVIL.
4. CONCRETE PAVING. REF. SOILS REPORT AND SEE CIVIL.
5. PRECAST CONCRETE PARKING BUMPER BLOCKS. SEE SPEC.
6. 4" CONCRETE SIDEWALK OVER 2" GRANULAR FILL. REF. DETAILS 3 & 5/SA-1.2.
7. ALIGN EDGE OF SIDEWALK WITH FACE OF BUILDING.
8. FUEL ISLAND. 6,000 GAL. DIESEL AND 2,000 GAL GAS IN FLAME SHIELD TANKS. SET PER KDHE REQUIREMENTS. INSTALL NEW PUMPS. SEE ELECTRICAL FOR CONNECTION REQUIREMENTS.
9. PIPE BOLLARD. REF. DETAIL 4/SA-1.2. MAX. 4' SPACING AROUND TANK PERIMETER.
10. HANDICAP CURB RAMP. REF. DTLS 1, 2/SA-1.2.
11. ROLLING CHAIN LINK GATE WITH OPERATOR, REF. DETAIL 14, 15 & 16/SA-1.2. SEE ELECT.
12. CONCRETE EQUIPMENT PADS UNDER ALL EQUIPMENT. SEE STRUCT., MECH. & ELEC. PLANS.
13. PIPE BOLLARD, SEE DETAIL 4/SA-1.2.
14. BRICK ACCENT WALL. REF. DETAIL 12/SA-1.2.
15. 6' HIGH CHAIN LINK FENCE. REF. DETAIL 13/SA-1.2.
16. 4' WIDE x 6' HIGH CHAIN LINK GATE WITH CARD READER LOCK.
17. HANDICAP ACCESSIBLE SIGN. REF. DETAIL 10/SA-1.2.
18. "STOP" SIGN, SEE CIVIL.
19. SEED ALL GRADED AREAS DISTURBED BY CONSTRUCTION. SEE SPECS.
20. PAINTED DIRECTIONAL ARROWS. SEE DETAILS 7 AND 8/SA-1.2.
21. LIGHT POLE, REF. ELECT.
22. BUS HEATER POST. SEE ELECT.
23. TRANSFORMER. SEE ELECT.
24. PROJECT SIGN, REF. 11/SA-1.2.
25. CARD READER ACCESS. REF. DTL. 9/SA-1.2.
26. RADIO TOWER. SEE ELECTRICAL AND SPECIFICATIONS.

Transportation

- Earthwork is progressing slowly due to the weather.
- Project is still on schedule to be completed by August 2016.

DATE
BIDDING
10/12/15

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JAMES L. NIGHTINGALE
LICENSED
3297
KANSAS
PROFESSIONAL ENGINEER
10-15-15

project no.
1583.00

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USD 261 HAYSVILLE SCHOOLS
HAYSVILLE USD 261
TRANSPORTATION FACILITY
7337 S. MERIDIAN
HAYSVILLE, KANSAS

sheet
SA-1.1

Campus High School

- Drawings are out for pricing.
- Subcontractors and suppliers will submit bids on February 9th.
- Meeting with City about options went well Mayor is working on the usages and maintenance agreements.
- Two options one 10 year lease second for the city to give the land.

BUILDING F

NEW ADDITION

BUILDING G

BUILDING E

2006 ADDITION

BUILDING H

BUILDING D

BUILDING C

NEW ADDITION

BUILDING I

BUILDING B

BUILDING A

S. MERIDIAN AVENUE

W. 55TH STREET S.

NORTH

1 ARCHITECTURAL SITE PLAN

1" = 30'-0"

DATE
12/15/2015
90% CONSTRUCTION DOCUMENTS

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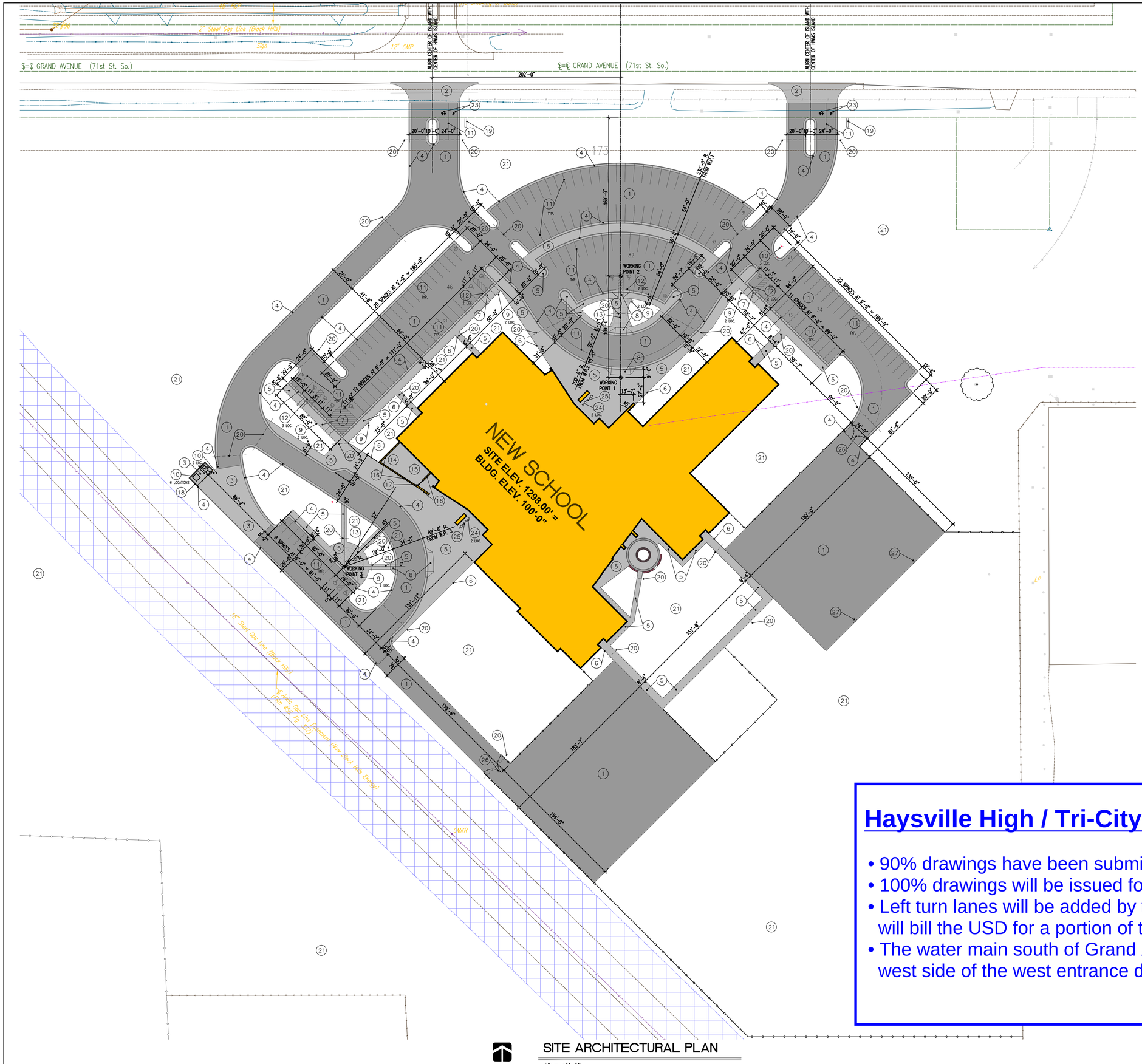
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USD 261 HAYSVILLE SCHOOLS
HAYSVILLE USD 261
CAMPUS HIGH SCHOOL
2100 W. 55th STREET S.
HAYSVILLE, KANSAS

sheet ONE

SITE

ONE



SITE ARCHITECTURAL PLAN

1" = 40'-0"

NORTH

GENERAL NOTES

1. G.C. IS RESPONSIBLE FOR SURVEYING EXISTING SITE CONDITIONS AND NOTIFYING ARCHITECT OF ANY DISCREPANCIES.
2. UNLESS NOTED OTHERWISE, DIMENSIONS ARE TO FACE OF CURB, FACE OF WALL, AND EDGE OR CONCRETE WORK (TYP.).
3. BACKFILL W/TOPSOIL (6" MIN.) TO WITHIN 1/2" OF TOP OF SIDEWALKS AND CURBS WITHIN LIMITS OF CONSTRUCTION.
4. DO NOT DISTURB SITE BENCH MARKS.
5. REF. CIVIL, MECH, AND ELEC. FOR COORDINATION OF UTILITIES.
6. REF. CIVIL FOR LIMITS OF CONSTRUCTION.
7. INSTALL 4" DIA. PVC PIPE SLEEVE UNDER ALL SIDEWALKS AND DRIVES, FOR FUTURE LANDSCAPE IRRIGATION SYSTEM. TURN ENDS UP 90 DEG. TO ABOVE GRADE AND CAP.

CONSTRUCTION PLAN NOTES

1. NEW ASPHALT PAVING, SEE CIVIL.
2. NEW CONCRETE APPROACH, SEE CIVIL.
3. NEW CONCRETE PAVING, SEE CIVIL.
4. NEW CONCRETE CURB AND GUTTER. SEE CIVIL.
5. NEW 4" CONCRETE SIDEWALK OVER 2" GRANULAR FILL. REF. CIVIL AND DETAILS 1 & 3 /SA-1.5
6. ALIGN EDGE OF SIDEWALK WITH FACE OF BUILDING.
7. NEW HANDICAP RAMP. REF. DETAIL 10/SA-1.5
8. NEW HANDICAP CURB RAMP. REF. DETAIL 4/SA-1.5
9. NEW HANDICAP ACCESSIBLE SIGN. SEE DETAIL 13/SA-1.4
10. PIPE BOLLARD, SEE DETAIL 9/SA-1.4
11. NEW PAVEMENT MARKING, SEE CIVIL.
12. NEW CONCRETE PARKING BUMPERS, SEE CIVIL.
13. FLAG POLE AND BASE, REF. DETAIL 6/SA-1.4 AND SPEC.
14. 4" CONCRETE SLAB INFILL AROUND CONCRETE EQUIPMENT PADS.
15. CONCRETE EQUIPMENT PADS UNDER ALL EQUIPMENT. SEE STRUCT., MECH. & ELEC. PLANS.
16. MASONRY SCREEN WALL AT MECHANICAL COURTYARD. REF. DETAIL 6 & 12/A-3.13
17. PAINTED STEEL GATE AT MECHANICAL COURTYARD. REF. DETAIL 14/SA-1.4
18. MASONRY SCREEN WALL & GATE AT TRASH ENCLOSURE. REF. DETAIL 1/SA-1.4
19. MONUMENT SIGN. REF. DETAIL 2/SA-1.5
20. PIPE SLEEVE PER GENERAL NOTE #7.
21. SEED ALL GRADED AREAS DISTURBED BY CONSTRUCTION. SEE SPECS.
22. CONC. BASE FOR LIGHT FIXTURE, SEE ELECT.
23. PAINTED DIRECTIONAL ARROWS. SEE DETAILS 7 & 8/SA-1.5.
24. BENCH SEATING, REF. SPEC.
25. TRASH RECEPTACLE, REF. SPEC. SECTION 02870.
26. STEEL PIPE GATES, SEE DETAIL 3/SA-1.4
27. OUTDOOR BASKETBALL GOAL, NET, BACKBOARD & POST, REF. SPECS.

Haysville High / Tri-City Day School

- 90% drawings have been submitted for review
- 100% drawings will be issued for pricing later this week.
- Left turn lanes will be added by the City on Grand Ave. They will bill the USD for a portion of the work.
- The water main south of Grand Ave. will be extended to the west side of the west entrance drive.

DATE
1/12/2016
90% CD SET

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project no.
15182.00

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USD 261 HAYSVILLE SCHOOLS
NEW HAYSVILLE HIGH / TRI-CITY SCHOOL
WEST GRAND AVE
HAYSVILLE, KANSAS

sheet
SA-1.3

Haysville Middle School

- Site Plan & Floor plans have been updated and show more detail.
- Exterior design has been developed.
  - o Entry Canopy
  - o Gymnasium
  - o Entry Lobby
- Two power poles removed from west side.

(95) TOTAL PARKING STALLS

(20) PARKING STALLS

(15) PARKING STALLS

(9) PARKING STALLS

(7) PARKING STALLS

(4) PARKING STALLS

(4) PARKING STALLS

(11) PARKING STALLS

Owner:
Unified School District 261
Haysville, KS

COMPOSITE SITE PLAN - NEW

1" = 30'-0"

NORTH

DATE
XX/XX/2015
SCHEMATIC DESIGN SET

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USD 261
HAYSVILLE SCHOOLS

HAYSVILLE MIDDLE SCHOOL - ADDITION & RENOVATION
900 W. GRAND AVENUE
HAYSVILLE, KS 67060

sheet

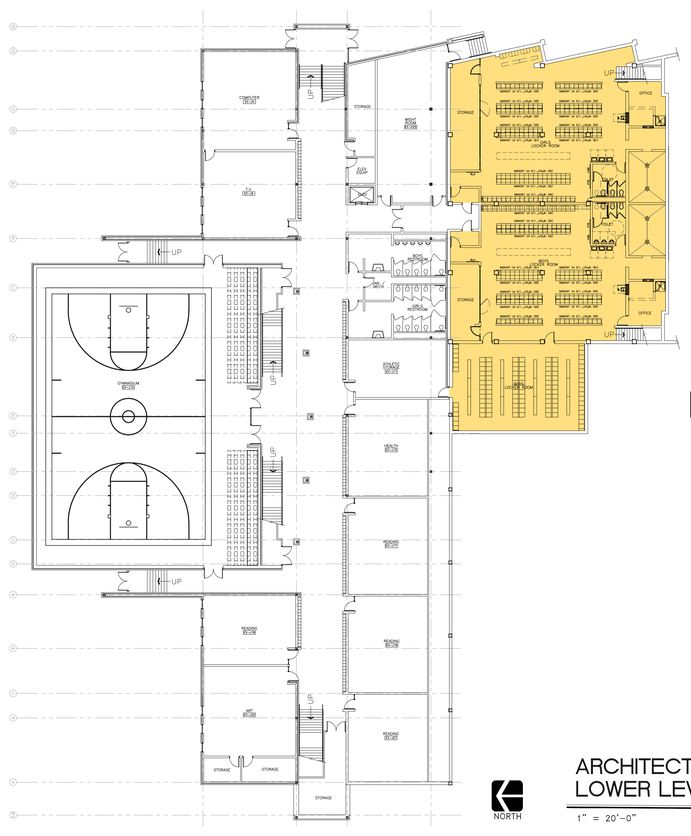
SA-13



NORTH

ARCHITECTURAL FLOOR PLAN
MAIN LEVEL - OVERALL

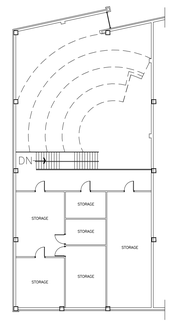
1" = 20'-0"



NORTH

ARCHITECTURAL FLOOR PLAN
LOWER LEVEL

1" = 20'-0"



NORTH

ARCHITECTURAL FLOOR PLAN
MEZZANINE

1" = 20'-0"

DATE
XX/XX/2015
SCHEMATIC DESIGN SET

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architecture

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USD 261
HAYSVILLE SCHOOLS

HAYSVILLE MIDDLE SCHOOL - ADDITION & RENOVATION

900 W. GRAND AVENUE
HAYSVILLE, KS 67060

sheet

A-2.1



USD 261 HAYSVILLE SCHOOLS

HAYSVILLE MIDDLE SCHOOL
VIEW FROM SW

JAN. 25, 2016

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USD 261 HAYSVILLE SCHOOLS

HAYSVILLE MIDDLE SCHOOL
VIEW FROM NW

JAN. 25, 2016

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USD 261
HAYSVILLE
SCHOOLS

HAYSVILLE MIDDLE SCHOOL
LOKCER ROOM AND LOBBY - SE CORNER

JAN. 25, 2016

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architecture



USD 261 HAYSVILLE SCHOOLS

HAYSVILLE MIDDLE SCHOOL
LOBBY

JAN. 25, 2016

HOWARD+HELMER architecture

TRAFFIC IMPACT STUDY **DECEMBER 2015**

Tri-City School (USD 261)

1975 W. Grand Ave.
Haysville, Kansas 67060

USD 261 HAYSVILLE SCHOOLS

PREPARED BY:

Professional Engineering Consultants, P.A.
303 South Topeka
Wichita, KS 67202
316-262-2691

PEC Project No.:
15476-013

PEC
www.pec1.com

This Traffic Impact Study summarizes the results of the traffic analysis for the proposed Tri-City School development project (herein referred to as "Proposed Project") in Haysville, Kansas. This proposed project will include the construction of a new single-story school building and parking lots on the 38.5-acre site. The main focus of this study is to evaluate the traffic conditions at the proposed driveways to the site, and determine any traffic or geometric enhancements necessary to improve the safety and operational efficiency of the Grand Avenue corridor.

- **Proposed Development Plan**
  - *Location Description*
    - The proposed project site is located at 1975 W. Grand Avenue within the city limits of Haysville, Kansas. The proposed project site is on the south side of the roadway midway between the intersections of 39th Street West and Meridian Avenue on the west side of the community. An area map and proposed site plan are included within ***Appendix A***.

  - *Land Use – Existing and Proposed*
    - The proposed site is currently used for soccer and football fields, and general open space.

    - The proposed site will include a 70,000 square foot building to serve as a high school with paved parking lots for a total of approximately 175 vehicles. The remaining area will be retained as general open space.

  - *Site Plan Access - Existing and Proposed*

    For this section, the driveway and lane widths are measured from edge-of-pavement to edge-of-pavement along the property line. The distance between the driveway and intersecting street is measured along the centerline of Grand Avenue from the centerline of the driveway to the centerline of the intersecting roadway.

    - The proposed project site currently has one access point along Grand Avenue. The driveway provides access to a gravel parking area for the sports fields, is approximately 20 feet wide, and is approximately 1,600 feet west of Meridian Avenue. As a part of the development, this driveway will be removed.

    - The proposed project site will have two access points along Grand Avenue. Each of the proposed driveways will be 50 feet wide which provides a single, 16-foot wide entry lane and two, 10-foot wide exit lanes separated by a 14-foot wide raised island. The proposed driveways will be approximately 1,425 feet and 1,840 feet west of Meridian Avenue and aligned with the existing driveways into the Haysville West Middle School (HWMS) on the north side of Grand Avenue.

- **Area Characteristics**
  - *Type of Area*
    - The proposed site is located within the city limits of Haysville and the area surrounding the site is developed with a variety of uses.

      To the east of the project site, the adjacent property is developed and occupied by USD #261 Service Center and the Administrative Office. East of the Administrative Office, the property on the southwest corner of the intersection of Grand Avenue and Meridian Avenue is developed and occupied by Freeman Elementary School.

To the south of the project site, the property is undeveloped and used for agricultural purposes.

To the west of the site, the adjacent property along the south side of Grand Avenue between the project site and 39th Street West is undeveloped and used for agricultural purposes.

Directly north of the project site, the property along the north side of Grand Avenue is developed and currently occupied by HWMS.

Immediately east of HWMS, the property is developed and occupied by St. Cecilia Church and School. East of the church, the property on the northwest corner of the intersection of Grand Avenue and Meridian Avenue is currently undeveloped and zoned for Light Commercial.

Immediately west of HWMS, the property is undeveloped and used for agricultural purposes. The properties on the northeast corner of the intersection of Grand Avenue and 39th Street West is developed with the Resurrection Lutheran Church and the vacated Sedgwick County Fire Station 4.

- **Roadway Characteristics**

  For this section, the roadway widths were measured from edge-of-pavement to edge-of-pavement.

  - Grand Avenue, which is known as 71st Street South within Sedgwick County, serves the Haysville community as an arterial route. The existing city limit on Grand Avenue is approximately midway between 39th Street West and Meridian Avenue.

    North of the development, Grand Avenue is approximately 26 feet wide and constructed of asphaltic concrete pavement with a 5 to 6-foot aggregate shoulder on each side and open ditches. The roadway is marked to provide one lane in both the east- and westbound directions. There is no sidewalk provided along either side of the roadway.

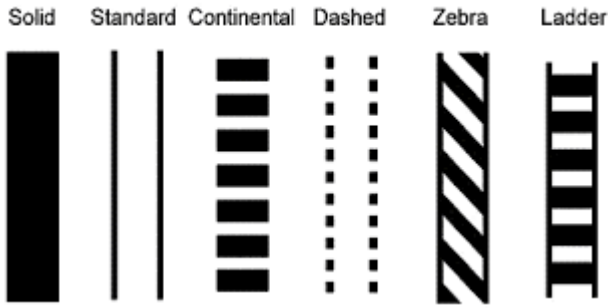
    At the intersection with Meridian Avenue, Grand Avenue expands to approximately 60 feet wide plus curb-and-gutter and provides for two lanes in each direction and an exclusive left-turn lane.

    The intersection of Grand Avenue and Meridian Avenue is currently signalized with protected/permissive left-turn phasing for all of the approaches. Pedestrian crosswalks, including pedestrian signal heads and pushbuttons, are provided across all of the approaches.

    The posted speed limit along Grand Avenue between Meridian Avenue and the west city limit is 35 mph. The posted speed limit on 71st Street South west of the city limit is 55 mph.

In addition, there is a school crossing across Grand Avenue in front of the St. Cecilia site, approximately 875 feet west of the intersection with Meridian Avenue. The crosswalk pavement markings utilize the standard style shown in *Figure 1*. However, the existing signing for the crossing fails to meet the current *Manual of Uniform Traffic Control Devices (MUTCD)* [1] criteria in regards to 1) color, 2) legend, and 3) advance warning.

Figure 1
Crosswalk Pavement Marking Options



- *Existing Transportation System Plans*
  - This segment of Grand Avenue is currently not scheduled for any improvements or upgrades within the City's current *Capital Improvements Plan*.

- *Design vehicle*
  - The design vehicle for the proposed driveway onto Grand Avenue is a passenger car. The largest, most frequent other type of vehicle will be a school bus. These vehicles would have a frequency of 10-15 vehicles per day to the site.

- *Adjacent Access Spacing*

  For this section, the distances given were measured along Grand Avenue between the centerlines of the two access points. The two proposed driveways are approximately 415 feet apart and will be aligned with the two existing driveways for HWMS.

  - On the same side of Grand Avenue as the site's proposed driveways, the first upstream access point is 39th Street West, which is approximately 3,440 feet west from the proposed west driveway. The first downstream access point is an existing low-use maintenance driveway for the water storage tower, which is approximately 210 feet east from the proposed east driveway. The next driveway downstream access point is the driveway for the Service Center, which is approximately 380 feet east from the proposed east driveway.

    On the opposite side of the Grand Avenue, the first upstream access point is an existing driveway for the St. Cecilia site, which is approximately 380 feet east from the proposed east driveway. The first downstream access point is an existing driveway for the Resurrection Lutheran Church, which is approximately 3,070 feet west from the proposed west driveway.

  - The City does not currently have any requirements for access spacing along arterial routes. From the Kansas Department of Transportation's *Access Management Policy* [2] (*AMP*), the recommended access spacing would be 200 feet in a developed area along an arterial route with a posted Speed Limit of 35 mph (*Table 4-6*). Many larger communities in the state have requirements that range from 250-400 feet between driveways along arterial roadways, depending on the average daily traffic on the roadway.

  Although Grand Avenue is not a state route, the provided access spacing of 380 feet from the proposed driveways, both upstream and downstream on both sides of the roadway, exceeds the

AMP's recommended spacing distance. In addition, the provided spacing is at the higher end of the ranges that have been adopted by many of the communities in the state.

- *Intersection Influence Area*
  - The City does not currently have any requirements for access spacing from intersections along arterial routes. From the *AMP*, the downstream functional distance is 195 feet for a 35 mph speed in a developed area (*Table 4-4*).

    The proposed east driveway onto Grand Avenue are approximately 1,425 feet from the Meridian Avenue intersection. The proposed driveway onto Grand Avenue will not be in the intersection downstream influence area.

- *Sight Distance*
  - The required sight distance for stopping on a level surface at 35-mph is 250 feet. Field measurements were taken along Grand Avenue approximately 500 feet on both sides of the proposed driveways and found to be adequate due to the relatively-flat and straight nature of the roadway. The existing sight distance would be adequate for vehicles on Grand Avenue to respond to vehicles turning into the proposed project site.

  - The required intersection sight distance for passenger cars exiting the site is 390 feet for a left turn and 335 feet for a right turn onto a 2-lane roadway. The intersection sight distance for the proposed driveways was measured to be in excess of 500 feet on Grand Avenue. The existing sight distance would be adequate for vehicles turning left or right from the site onto Grand Avenue.

- **Existing Traffic Condition Plus Site Generated Traffic**
  - *Traffic Volumes – Existing and Future / Daily and Peak Hour*
    - According to Sedgwick County's 2014 *Traffic Counts Map* [3], the traffic count on Grand Avenue near the Haysville City limit is 2,707 vehicles per day (vpd).

      Automatic traffic recorders (ATR) were placed at three locations along Grand Avenue and collected 24-hour traffic volumes from Tuesday November 10 through Thursday November 12, 2015. The location of these counts is shown on the Area Map within ***Appendix A*** and the results of the counts are included within ***Appendix B***. At the Haysville City Limit, the average daily traffic is 2,948 vpd with peak hour traffic of 274 vehicles (9.3%) during the AM peak hour and 304 vehicles (10.3%) during the PM peak hour.

      The background growth rate for this corridor was calculated to be approximately 1.4% for the previous 6 years based on the Sedgwick County traffic data. Due to the amount of vacant property west of the project site, the future traffic volumes for the corridor were conservatively calculated using a 2.0% growth rate for 20 years. Based on this assumption, the future average daily traffic is 4,020 vpd. Assuming the peak hour volume is 10% of the daily traffic and the directional distribution 50%/50%, the future peak hour directional volume would be 201 vehicles per hour (vph).

      In addition, manual peak hour turning movement traffic counts were collected at the intersections of the existing HWMS driveways and Grand Avenue. These traffic counts were conducted on Tuesday November 10, 2015, with the morning study period running from 7:00-

9:00 AM and the afternoon study period running from 2:30-5:30 PM. The results of these turning movement counts is also included within ***Appendix B***.

- *ITE Daily Trips and Trips in the Peak Hour of the Generator of the Site*
  - Based on the land use of a *High School* (Land Use Code 530) from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* [4], the average vehicle trip rate is 19.74 trips per employee for a Weekday; 4.68 trips per employee for the AM peak hour; and 3.23 trips per employee for the PM peak hour of the Generator. The *ITE Trip Generation* statistical data sheets are included within ***Appendix C***. The peak hour of the Generator occurs from 2:30-3:30 PM.

    The independent variable of 'Employee' was used instead of 'Students' or '1000 sq. feet Gross Floor Area' due to the fact that the school is not a typical high school and will have a lower student/teacher ratio. The Tri-City School is expected to have around 45 employees, but for the study, it was assumed to have a working staff of 50 employees.

    Based on the average rates above, the project site will produce a total of 987 vehicles per day, with 234 vehicles in the AM peak hour and 162 vehicles in the PM peak hour.

- *Trip/Driveway Distribution of Vehicles Entering and Exiting in Peak Hour*
  - With the proposed site improvements, there will be two access points to the site along Grand Avenue. The proposed driveways will be approximately 1,425 feet and 1,840 feet west of Meridian Avenue and aligned with the existing driveways into the HWMS on the north side of Grand Avenue.

    The *Trip Generation Manual* has the directional distribution of 50% entering with 50% exiting during the day, and 70% entering with 30% exiting during the AM peak hour, and 31% entering with 69% exiting during the PM peak hour. Based on this assumptions, the proposed site will have a daily total of 494 vehicles entering and 494 vehicles exiting. For the peak hours, the proposed site will have 164 vehicles entering and 70 vehicles exiting during the AM peak hour and 50 vehicles entering and 112 vehicles exiting the during the PM peak hour.

    Based on the site circulation patterns for the AM peak hour, it is expected that 60% of the entering vehicles will utilize the proposed west driveway and the remaining 40% will utilize the proposed east driveway onto Grand Avenue. It is also expected that 25% of the exiting vehicles will utilize the proposed west driveway and the remaining 75% will utilize the proposed east driveway. During the AM peak hour, the proposed west driveway will have 98 vehicles entering and 18 vehicles exiting and the proposed east driveway will have 66 vehicles entering and 52 vehicles exiting.

    During the PM peak hour, it is expected that 80% of the entering vehicles will utilize the proposed west driveway and the remaining 20% will utilize the proposed east driveway onto Grand Avenue. It is also expected that 35% of the exiting vehicles will utilize the proposed west driveway and the remaining 65% will utilize the proposed east driveway. During the PM peak hour, the proposed west driveway will have 40 vehicles entering and 40 vehicles exiting and the proposed east driveway will have 10 vehicles entering and 72 vehicles exiting.

Based on the peak hour turning movements at HWMS, approximately 10% of the traffic to/from the site was from the west with the remaining 90% to/from the east. It is assumed that traffic into the project site will follow similar patterns.

Based on this assumption for the AM peak hour, the entering traffic at the proposed west driveway will be 20 vehicles from the west and 78 vehicles from the east, and the exiting traffic will be 8 vehicles going to the west and 10 vehicles going to the east. The entering traffic at the proposed east driveway will be 4 vehicles from the west and 62 vehicles from the east, and the exiting traffic will be 2 vehicles going to the west and 50 vehicles going to the east.

During the PM peak hour, the entering traffic at the proposed west driveway will be 4 vehicles from the west and 36 vehicles from the east, and the exiting traffic will be 9 vehicles going to the west and 19 vehicles going to the east. The entering traffic at the proposed east driveway will be 1 vehicle from the west and 9 vehicles from the east, and the exiting traffic will be 3 vehicles going to the west and 69 vehicles going to the east.

The existing, existing plus development, future without development and future plus development traffic volumes are summarized in ***Appendix D***.

- *Auxiliary Lane Warrants*

  Exclusive turning lanes, for either left or right turns, have been shown to improve traffic safety as well as improve travel speeds, reduce delay and reduce congestion by separating the turning vehicles form the thru movement traffic.

  - Right-turn Lane – Dedicated right-turn lanes are recommended when peak hour turning traffic is high; when the right turning traffic consists of large vehicles or vehicles with trailers; when operating speeds on the mainline roadway are high and drivers would do not expect right turns; the internal site design and circulation leads to backups on the mainline; or when the intersection or driveway angle is highly skewed. In particular, *K-Tran:KSU-95-5 "Guidelines for right-turn treatments at unsignalized intersections and driveways*" provides guidance in determining if a right-turn lane is necessary or beneficial based on the traffic conditions. The three key data elements for a right-turn are 1) the advancing volume, 2) the posted speed limit, and 3) the right-turn volumes.

    Based on *Table 4-25* of the *AMP* (which was developed from the above K-Tran's report), a right-turn lane or a deceleration taper is not warranted at a driveway when the posted speed limit is below 40 mph or the directional design hourly volume (DDHV) is below 300 vph. When the DDHV is between 300-400 vph, a minimum volume of 85 vph turning right is required to warrant a right-turn taper and 200 vph is required to warrant a right-turn lane.

    Based on the existing traffic counts, the highest eastbound volume at the west driveway was 183 vph, and the highest eastbound volume at the east driveway is 285 vph. Under the existing conditions, a right-turn lane or taper is <u>not</u> recommended.

    During the AM peak hour, the future eastbound volume at the west driveway is 242 vehicles with 20 vehicles turning right. During the PM peak hour, the future eastbound volume is 143 vehicles with 4 vehicles turning right. Based on the future volumes during the peak hour, a right-turn lane or taper is <u>not</u> recommended.

During the AM peak hour, the future eastbound volume at the east driveway is 311 vehicles with 4 vehicles turning right. During the PM peak hour, the future eastbound volume is 263 vehicles with 1 vehicle turning right. Based on the future volumes during the peak hour, a right-turn lane or taper is not recommended.

- Left-turn Lane – The National Cooperative Highway Research Program (NCHRP) has several reports regarding the design of left-turn accommodations at unsignalized intersections, which also includes driveways. In particular, *NCHRP Report 745 "Left-Turn Accommodations at Unsignalized Intersections*" provides guidance in determining if a left-turn lane is necessary or beneficial based on the traffic conditions. The four key data elements for a left-turn are 1) the opposing volume, 2) the advancing volume, 3) the posted speed limit, and 4) the percentage of left-turns.

  Based on *Table 4-28* of the *AMP (*which was developed from the above NCHRP report), left-turn lane analysis was conducted on the two proposed driveways during the peak hours for the existing plus development and future plus development conditions. The results of the analysis are shown in ***Appendix E*** and summarized in *Table 1*:

Table 1: Left-Turn Lane Analysis		
	AM Peak Hour	PM Peak Hour
West Driveway		
Existing Volumes	Satisfied	Not Satisfied
Future Volumes	Satisfied	Not Satisfied
East Driveway		
Existing Volumes	Satisfied	Not Satisfied
Future Volumes	Satisfied	Not Satisfied

  Based on the analysis, a left-turn lane is recommended at both driveways.

- The components of a left-turn lane include the storage length, deceleration length, bay taper length and through-lane taper length. See *Figure 2* for the components of a left-turn lane with widening on both sides of the roadway and *Figure 3* for the components of a left-turn lane with widening on one side of the roadway.

Figure 2

Left-Turn Lane with Widening on Both Sides of Roadway

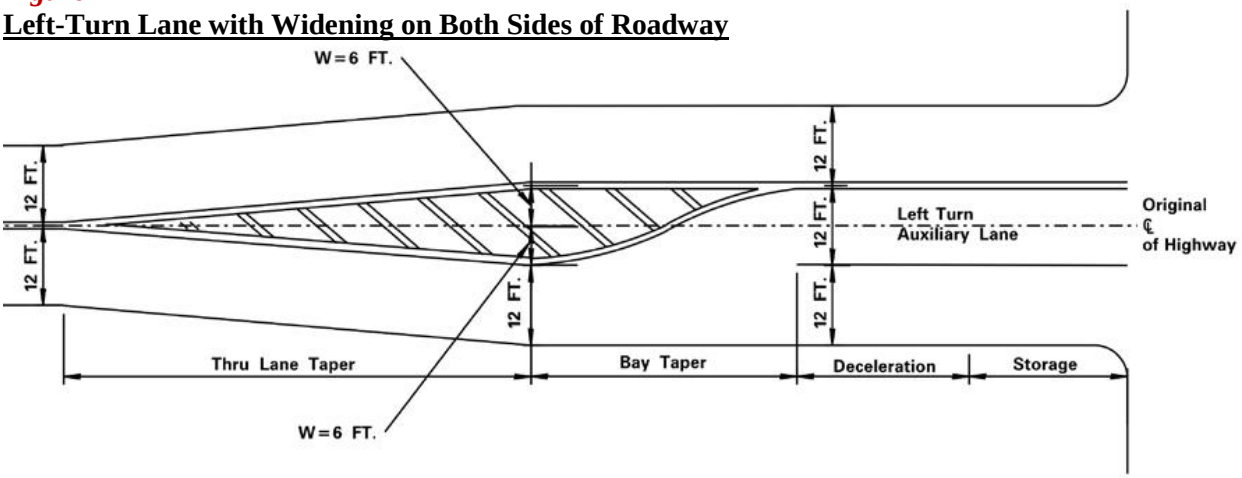
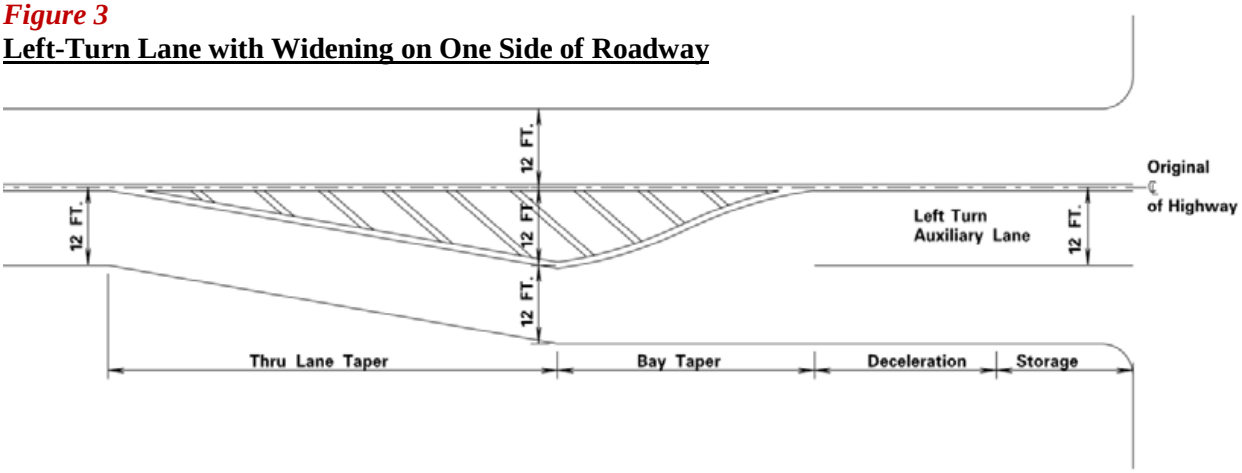


Figure 3

Left-Turn Lane with Widening on One Side of Roadway



Typically, the turn lane storage length for an uncontrolled movement is based on the number of vehicles likely to arrive in an average two-minute period with each vehicle occupying 25 feet. During the peak hour at the west driveway, the average number of westbound vehicles arriving in a two-minute period is 2.6 vehicles. Therefore, the calculated minimum storage length of a left-turn bay should be a minimum of 65 feet. During the peak hour at the east driveway, the average number of westbound vehicles arriving in a two-minute period is 2.1 vehicles. Therefore, the calculated minimum storage length of a left-turn bay should be a minimum of 53 feet, rounded up to 55 feet.

The deceleration length for a left-turn is based on the need to stop (0 mph) before making the turning maneuver. The deceleration length with a posted speed limit of 35 mph is 135 feet.

With the left-turn lane improvement centered within the existing roadway, the thru-lane taper should be a minimum of 122.5 feet in length, using the formula of $L = (WS^2/60)$ [posted speed limit less than 45 mph]. The bay taper length in a developed area with a posted speed limit of 35 mph should be a minimum of 60 feet (10:1) for a straight line taper.

With the left-turn lane improvement offset to one side of the roadway, the thru-lane taper should be a minimum of 245 feet in length and the bay taper should be a minimum of 120 feet (10:1) for a straight line taper.

- *Driveway Analysis*
  - The traffic operations at the driveways along Grand Avenue were evaluated by computing the respective service capacities, amounts of vehicle delay, and levels-of-service for each vehicular movement at the site.

    The Level-of-Service (LOS) is a term used to describe the operating conditions of traffic flow during peak periods. The LOS is designated by a letter ranging from A to F. **LOS A** represents little or no vehicle delays occur and vehicles can maneuver freely. **LOS F** represents extensive traffic queues and traffic delays. The *Highway Capacity Manual* [5] (HCM) outlines the LOS criteria for signalized and unsignalized intersections as shown in *Table 2*. In urban areas, acceptable design service levels for an intersection are generally **LOS C**. **LOS D** is acceptable if achieving **LOS C** is cost prohibitive or would require significant property impacts.

Table 2: HCM Level-of-Service Criteria

Level of Service (LOS)	Unsignalized Intersection Average Delay per Vehicle	Signalized Intersection Average Delay per Vehicle
A	<= 10 seconds	<= 10 seconds
B	10 – 15 seconds	10 – 20 seconds
C	15 – 25 seconds	20 – 35 seconds
D	25 – 35 seconds	35 – 55 seconds
E	35 – 50 seconds	55 – 80 seconds
F	≥ 50 seconds	≥ 80 seconds

LOS Capacity Analysis for the driveway intersections onto Grand Avenue were completed utilizing the *HCS2010* [6] highway capacity software for the existing plus development volumes during the peak hours. During the analysis, it was assumed the driveway intersections were functioning as stop-controlled for the traffic exiting HWMS and the site. Furthermore, the roadway geometrics were based on the recommended roadway conditions and the observed peak hour traffic volumes. See ***Appendix F*** for the LOS reports.

The northbound and southbound approaches at the unsignalized intersection of Grand Avenue with the west driveways will operate at **LOS C** or better during the AM and PM peak hours.

The northbound and southbound approaches at the unsignalized intersection of Grand Avenue with the east driveways will operate at **LOS B** or better during the AM and PM peak hours with the exception of the southbound approach during the AM peak hour, which will operate at **LOS F** or better. This low LOS can be attributed to the increased traffic at the intersection and the significant number of vehicles trying to make a left-turn from HWMS. Even though the LOS is less than favorable, the resulting queue length for the left-turning traffic would be expected to be 5.2 vehicles, or 130 feet.

- The *MUTCD* is the federally-accepted document that specifies the conditions necessary to justify the installation of a traffic signal. These conditions, called warrants, are based on a number of factors including: the traffic volumes and speeds, accident history, roadway geometrics and pedestrian activity. These warrants are contained within Chapter 4C, "Traffic Control Signal Needs Studies" and determine whether installation of a traffic control signal is justified at a particular location.

  The MUTCD directs that a traffic signal should not be installed unless one or more of the warrants are met, and that the satisfaction of any warrant or warrants shall not in itself require the installation of a traffic control signal. The traffic signal should only be installed if its operation improves the overall safety and/or operation of the intersection.

  Analysis was performed to determine which, if any, of the signal warrants would be met at the intersection of Grand Avenue with the school driveways based on the proposed roadway geometrics and the existing plus development traffic volumes. Even if the traffic volumes were combined onto a single driveway, the intersection did not meet any of the warrants and therefore is not recommended for signalization. See ***Appendix G*** for the signalization warrant report.

- **Proposed Recommendations**
  - *Findings Summary*
    - The proposed driveways from the Tri-City School onto Grand Avenue will be 50 feet wide which provides a single, 16-foot wide entry lane and two 10-foot wide exit lanes separated by a 14-foot wide raised island. The proposed driveways will be aligned with the existing driveways into the Haysville West Middle School on the north side of Grand Avenue.

    - Drivers along Grand Avenue need a clear view of the access driveway to be able to slow or stop if required. In addition, drivers exiting the site need a clear view of Grand Avenue when selecting an appropriate gap in traffic to complete a turn. In both cases, the measured field conditions exceed the recommended distances.

    - Although, the City does not currently have any requirements for access spacing along arterial routes, the Kansas Department of Transportation's Access Management Policy (AMP) recommended access spacing would be 200 feet in a developed area along an arterial route with a posted speed limit of 35 mph. The access spacing, both upstream and downstream from the proposed driveways, exceeds the recommended distances.

    - Due to low traffic volumes, right-turn auxiliary lanes into the proposed site are not warranted on Grand Avenue.

    - Due to the low traffic volumes, traffic signalization at the intersections of Grand Avenue and the school driveways is not warranted.

  - *Need for Roadway Improvements*
    - To maintain the operational efficiency of the proposed driveways onto Grand Avenue, it is recommended to install a left-turn lanes at each of the driveways. The following are the minimum recommended dimensions for the left-turn lane improvements:

      - Lane Width - 12 feet
      - Shoulder Width - 5 to 6 feet (match existing)
      - Deceleration Length - 135 feet
      - Storage Length
        - West Driveway - 50 feet (Eastbound) / 65 feet (Westbound)
        - East Driveway - 50 feet (Eastbound) / 55 feet (Westbound)
      - Thru-Lane Taper Length
        - Centered in Roadway - 122.5 feet
        - Offset to One Side of Roadway - 245 feet
      - Bay Taper Length
        - Centered in Roadway - 60 feet
        - Offset to One Side of Roadway- 120 feet

References

[1] U.S. Department of Transportation – Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets and Highways*, 2009 Edition, 2010.

[2] Kansas Department of Transportation, "*Access Management Policy*", www.ksdot.org/Assets/wwwksdotorg/bureaus/burTransPlan/AccessMgt/Access_Management_Policy_Jan2013.pdf, adopted January 2013.

[3] Sedgwick County, Kansas, "2014 ADT Traffic Counts Map", http://www.sedgwickcounty.org/public_works/maps.asp, January 2015.

[4] Institute of Transportation Engineers, *Trip Generation Manual,* 9th Edition, 2012.

[5] Transportation Research Board, *Highway Capacity Manual*, TRB Publications, 2010.

[6] McTrans Center, University of Florida, *HCS 2010 TWSC*, Version 6.7, 2015.



This report was prepared by:

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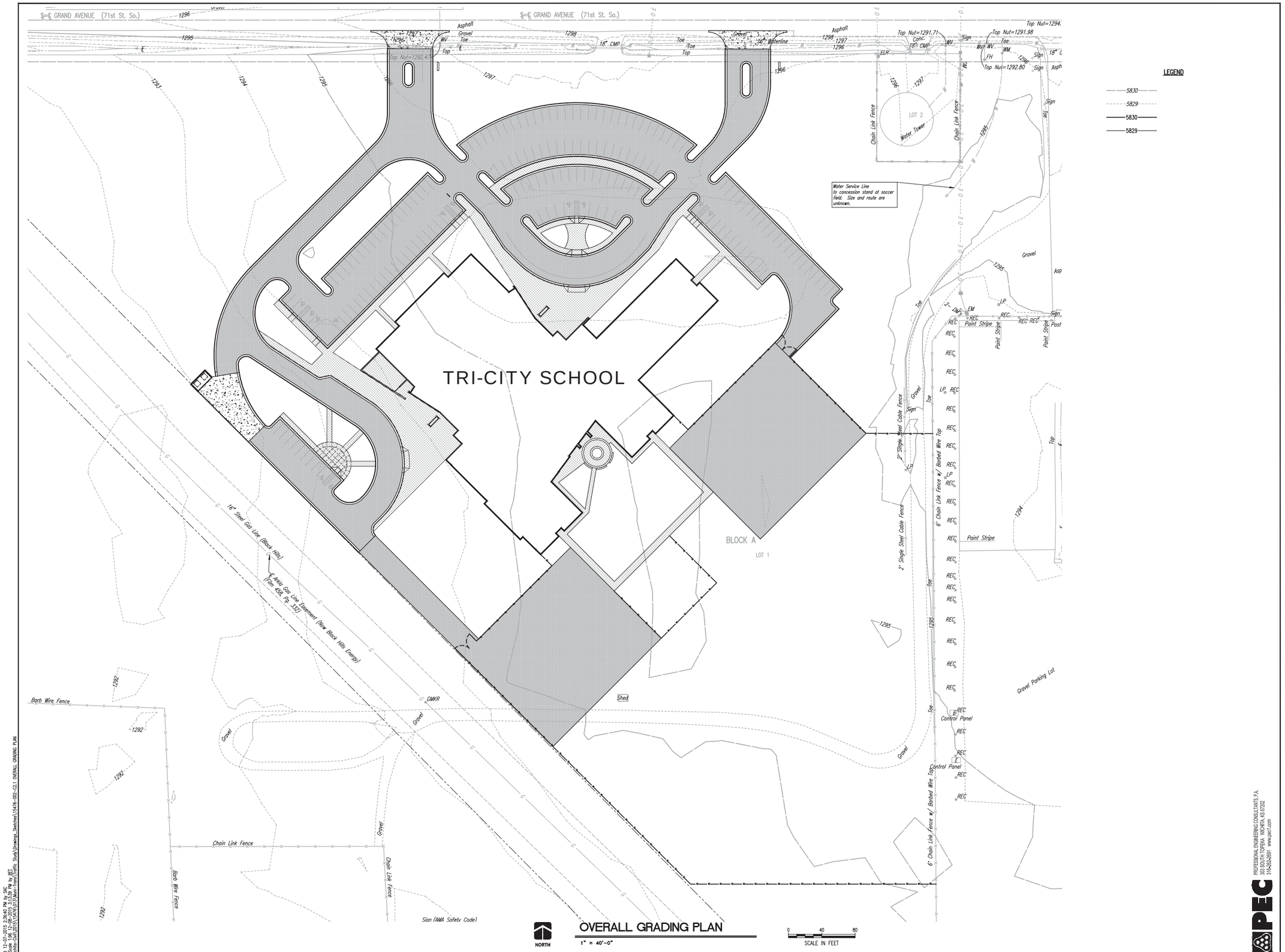
Tri-City School (USD 261)

1975 W. Grand Ave.
Haysville, Kansas 67060

APPENDIX A

- Area Map
- Site Plan


Area Map
Not to Scale
Meridian Avenue
Grand Avenue
71st Street S
39th Street W
LEGEND
Project Site
Traffic Count Location
Haysville City Limits



DATE
BIDDING
10/12/2015
ADDENDUM NO. 1
10/30/2015

HOWARD+HELMER
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www.howardandhelmer.com
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USD 261 HAYSVILLE SCHOOLS

HAYSVILLE USD 261
TRI-CITY SCHOOL
7337 S. MERIDIAN
HAYSVILLE, KANSAS

sheet
C2.1

Saved: 12-07-2015 2:56:41 PM by SAC
Plotted: 12-07-2015 2:57:15 PM by BJT
I:\Active Cad\2015\15410.011\Working\Traffic Study\Drawings_Sketches\15476-003-C2.1 OVERALL GRADING PLAN

Tri-City School (USD 261)

1975 W. Grand Ave.
Haysville, Kansas 67060

APPENDIX B

- **Existing Traffic Volumes**
- **Turning Movement Volumes at Grand Ave. & Haysville West Middle School Driveways**

Professional Engineering Consultants, P.A.

303 South Topeka
Wichita, Kansas 67202

71st St - W of W Dr @ HWMS

Site Code:
Station ID:

Start	09-Nov-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	*	*	8	2	12	0	7	1	*	*	*	*	*	*	9	1
01:00	*	*	3	2	4	4	5	3	*	*	*	*	*	*	4	3
02:00	*	*	11	1	8	2	6	5	*	*	*	*	*	*	8	3
03:00	*	*	3	7	1	5	1	5	*	*	*	*	*	*	2	6
04:00	*	*	11	39	14	37	15	39	*	*	*	*	*	*	13	38
05:00	*	*	39	73	32	49	35	74	*	*	*	*	*	*	35	65
06:00	*	*	81	**148**	46	**128**	77	**148**	*	*	*	*	*	*	68	**141**
07:00	*	*	**175**	147	**91**	110	**164**	137	*	*	*	*	*	*	**143**	131
08:00	*	*	92	74	65	61	107	67	*	*	*	*	*	*	88	67
09:00	*	*	65	64	66	55	72	73	*	*	*	*	*	*	68	64
10:00	*	*	61	56	89	54	67	61	*	*	*	*	*	*	72	57
11:00	*	*	72	57	74	67	85	38	*	*	*	*	*	*	77	54
12:00 PM	*	*	78	77	64	61	80	65	*	*	*	*	*	*	74	68
01:00	*	*	62	61	52	45	81	65	*	*	*	*	*	*	65	57
02:00	*	*	93	89	73	47	111	88	*	*	*	*	*	*	92	75
03:00	*	*	174	122	151	97	180	131	*	*	*	*	*	*	168	117
04:00	*	*	**200**	142	156	85	**192**	**135**	*	*	*	*	*	*	**183**	121
05:00	*	*	166	**148**	**172**	**105**	177	132	*	*	*	*	*	*	172	**128**
06:00	*	*	71	68	74	85	67	80	*	*	*	*	*	*	71	78
07:00	*	*	37	46	39	44	40	49	*	*	*	*	*	*	39	46
08:00	*	*	46	42	28	43	24	37	*	*	*	*	*	*	33	41
09:00	*	*	19	41	21	33	17	26	*	*	*	*	*	*	19	33
10:00	*	*	14	12	14	16	16	20	*	*	*	*	*	*	15	16
11:00	*	*	11	10	13	5	13	9	*	*	*	*	*	*	12	8
Lane	0	0	1592	1528	1359	1238	1639	1488	0	0	0	0	0	0	1530	1418
Day	0		3120		2597		3127		0		0		0		2948	
AM Peak	-	-	07:00	06:00	07:00	06:00	07:00	06:00	-	-	-	-	-	-	07:00	06:00
Vol.	-	-	175	148	91	128	164	148	-	-	-	-	-	-	143	141
PM Peak	-	-	16:00	17:00	17:00	17:00	16:00	16:00	-	-	-	-	-	-	16:00	17:00
Vol.	-	-	200	148	172	105	192	135	-	-	-	-	-	-	183	128

Comb. Total	0		3120		2597		3127		0		0		0	2948

ADT ADT 2,948 AADT 2,948

Professional Engineering Consultants, P.A.

303 South Topeka
Wichita, Kansas 67202

71st between HWMS Drives

Site Code:
Station ID:

Start	09-Nov-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	8	0	10	2	8	0	*	*	*	*	*	*	9	1
01:00	*	*	6	0	7	1	8	0	*	*	*	*	*	*	7	0
02:00	*	*	12	0	8	2	11	0	*	*	*	*	*	*	10	1
03:00	*	*	10	0	5	1	6	0	*	*	*	*	*	*	7	0
04:00	*	*	50	1	42	8	55	0	*	*	*	*	*	*	49	3
05:00	*	*	120	1	60	19	121	1	*	*	*	*	*	*	100	7
06:00	*	*	224	7	**140**	34	221	0	*	*	*	*	*	*	195	14
07:00	*	*	**365**	7	123	73	**367**	1	*	*	*	*	*	*	**285**	27
08:00	*	*	159	7	71	57	170	4	*	*	*	*	*	*	133	23
09:00	*	*	134	3	62	56	128	6	*	*	*	*	*	*	108	22
10:00	*	*	79	43	56	**91**	105	20	*	*	*	*	*	*	80	51
11:00	*	*	77	**74**	68	71	41	**86**	*	*	*	*	*	*	62	**77**
12:00 PM	*	*	72	76	60	60	65	65	*	*	*	*	*	*	66	67
01:00	*	*	63	57	48	49	68	78	*	*	*	*	*	*	60	61
02:00	*	*	105	130	49	**75**	103	136	*	*	*	*	*	*	86	114
03:00	*	*	123	185	213	27	131	**192**	*	*	*	*	*	*	156	**135**
04:00	*	*	**159**	**203**	228	12	151	189	*	*	*	*	*	*	179	135
05:00	*	*	152	187	**275**	5	**187**	136	*	*	*	*	*	*	**205**	109
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11:00	*	*	20	1	18	0	22	0	*	*	*	*	*	*	20	0
Lane	0	0	2302	1043	1940	647	2359	917	0	0	0	0	0	0	2201	870
Day	0		3345		2587		3276		0		0		0		3071	
AM Peak	-	-	07:00	11:00	06:00	10:00	07:00	11:00	-	-	-	-	-	-	07:00	11:00
Vol.	-	-	365	74	140	91	367	86	-	-	-	-	-	-	285	77
PM Peak	-	-	16:00	16:00	17:00	14:00	17:00	15:00	-	-	-	-	-	-	17:00	15:00
Vol.	-	-	159	203	275	75	187	192	-	-	-	-	-	-	205	135

Comb. Total	0	3345	2587	3276	0	0	0	3071

ADT ADT 3,069 AADT 3,069

Professional Engineering Consultants, P.A.

303 South Topeka
Wichita, Kansas 67202

71st E of HWMS Drives

Site Code:
Station ID:

Start	09-Nov-15		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
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01:00	*	*	3	3	4	4	6	3	*	*	*	*	*	*	4	3
02:00	*	*	11	1	8	2	6	5	*	*	*	*	*	*	8	3
03:00	*	*	3	7	1	5	1	5	*	*	*	*	*	*	2	6
04:00	*	*	8	42	10	39	15	39	*	*	*	*	*	*	11	40
05:00	*	*	44	89	29	50	41	87	*	*	*	*	*	*	38	75
06:00	*	*	76	172	45	**128**	68	169	*	*	*	*	*	*	63	156
07:00	*	*	**266**	**284**	82	114	**260**	**282**	*	*	*	*	*	*	**203**	**227**
08:00	*	*	95	91	61	60	106	83	*	*	*	*	*	*	87	78
09:00	*	*	73	73	60	59	67	76	*	*	*	*	*	*	67	69
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01:00	*	*	62	71	49	43	81	78	*	*	*	*	*	*	64	64
02:00	*	*	146	158	69	50	150	155	*	*	*	*	*	*	122	121
03:00	*	*	**213**	136	136	102	**225**	145	*	*	*	*	*	*	**191**	128
04:00	*	*	213	170	163	90	195	156	*	*	*	*	*	*	190	139
05:00	*	*	205	**199**	**174**	**109**	177	**189**	*	*	*	*	*	*	185	**166**
06:00	*	*	94	68	74	87	130	72	*	*	*	*	*	*	99	76
07:00	*	*	39	48	38	45	41	50	*	*	*	*	*	*	39	48
08:00	*	*	35	74	26	40	24	37	*	*	*	*	*	*	28	50
09:00	*	*	64	46	22	37	17	29	*	*	*	*	*	*	34	37
10:00	*	*	16	12	15	16	28	28	*	*	*	*	*	*	20	19
11:00	*	*	12	12	13	5	15	9	*	*	*	*	*	*	13	9
Lane	0	0	1917	1980	1310	1272	1892	1887	0	0	0	0	0	0	1705	1714
Day	0		3897		2582		3779		0		0		0		3419	
AM Peak	-	-	07:00	07:00	10:00	06:00	07:00	07:00	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	266	284	85	128	260	282	-	-	-	-	-	-	203	227
PM Peak	-	-	15:00	17:00	17:00	17:00	15:00	17:00	-	-	-	-	-	-	15:00	17:00
Vol.	-	-	213	199	174	109	225	189	-	-	-	-	-	-	191	166

Comb. Total	0	3897	2582	3779	0	0	0	3419

ADT ADT 3,419 AADT 3,419

PEAK HOUR
TURNING MOVEMENT VOLUMES
ALL VEHICLES
GRAND AVE. & HWMS WEST DRIVEWAY

LOCATION: Grand Ave. & West Drive (HWMS)
CITY: Haysville, Kansas
DATE: Tuesday, November 10, 2015
WEATHER: Partly Cloudy

DATA FILE: TM-Grand_W Dr.ppd
COLLECTED BY: S. Canfield
OTHER:

ALL VEHICLES

START	END	SOUTHBOUND					WESTBOUND					NORTHBOUND					EASTBOUND					INT
TIME	TIME	LT	TH	RT	PED	TOTAL	LT	TH	RT	PED	TOTAL	LT	TH	RT	PED	TOTAL	LT	TH	RT	PED	TOTAL	TOTAL
7:00 AM	7:15 AM	11	0	4	0	15	0	31	10	0	41	0	0	0	0	0	0	47	0	0	47	103
7:15 AM	7:30 AM	56	0	7	0	63	0	37	8	0	45	0	0	0	0	0	6	42	0	0	48	156
7:30 AM	7:45 AM	5	0	2	0	7	0	28	0	0	28	0	0	0	0	0	0	40	0	0	40	75
7:45 AM	8:00 AM	0	0	1	0	1	0	41	0	0	41	0	0	0	0	0	1	34	0	0	35	77
8:00 AM	8:15 AM	2	0	0	0	2	0	23	0	0	23	0	0	0	0	0	2	26	0	0	28	53
8:15 AM	8:30 AM	2	0	0	0	2	0	21	0	0	21	0	0	0	0	0	0	25	0	0	25	48
8:30 AM	8:45 AM	1	0	0	0	1	0	14	0	0	14	0	0	0	0	0	0	16	0	0	16	31
8:45 AM	9:00 AM	2	0	0	0	2	0	15	2	0	17	0	0	0	0	0	0	15	0	0	15	34
2:30 PM	2:45 PM	0	0	0	0	0	0	21	14	0	35	0	0	0	0	0	1	19	0	0	20	55
2:45 PM	3:00 PM	47	0	4	0	51	0	25	6	0	31	0	0	0	0	0	2	32	0	0	34	116
3:00 PM	3:15 PM	9	0	2	0	11	0	31	1	0	32	0	0	0	0	0	0	23	0	0	23	66
3:15 PM	3:30 PM	3	0	1	0	4	0	22	0	0	22	0	0	0	0	0	1	22	0	0	23	49
3:30 PM	3:45 PM	2	0	0	0	2	0	9	1	0	10	0	0	0	0	0	1	21	0	0	22	34
3:45 PM	4:00 PM	8	0	4	0	12	0	39	2	0	41	0	0	0	0	0	3	55	0	0	58	111
4:00 PM	4:15 PM	2	0	2	0	4	0	48	1	0	49	0	0	0	0	0	0	38	0	0	38	91
4:15 PM	4:30 PM	0	0	0	0	0	0	37	0	0	37	0	0	0	0	0	1	43	0	0	44	81
4:30 PM	4:45 PM	1	0	1	0	2	0	29	1	0	30	0	0	0	0	0	0	65	0	0	65	97
4:45 PM	5:00 PM	8	0	1	0	9	0	34	1	0	35	0	0	0	0	0	3	44	0	0	47	91
5:00 PM	5:15 PM	11	0	5	0	16	0	42	1	0	43	0	0	0	0	0	2	38	0	0	40	99
5:15 PM	5:30 PM	5	0	5	0	10	0	29	0	0	29	0	0	0	0	0	2	53	0	0	55	94
5:30 PM	5:45 PM																					
5:45 PM	6:00 PM																					
6:00 PM	6:15 PM																					

GRAND TOTAL	175	0	39	0	214	0	576	48	0	624	0	0	0	0	0	25	698	0	0	723	1561
APPR %						0.0	92.3	7.7								3.5	96.5	0.0			
TOTAL %	11.2	0.0	2.5			0.0	36.9	3.1			0.0	0.0	0.0			1.6	44.7	0.0			

AM PK HR	7:00 AM		to	8:00 AM																	
HR TOTAL	72	0	14	0	86	0	137	18	0	155	0	0	0	0	0	7	163	0	0	170	411
PHF					0.341					0.861										0.885	0.659
APPR %	83.7	0.0	16.3			0.0	88.4	11.6								4.1	95.9	0.0			
TOTAL %	17.5	0.0	3.4			0.0	33.3	4.4			0.0	0.0	0.0			1.7	39.7	0.0			

PM PK HR	4:30 PM		to	5:30 PM																	
HR TOTAL	25	0	12	0	37	0	134	3	0	137	0	0	0	0	0	7	200	0	0	207	381
PHF					0.578					0.797										0.796	0.962
APPR %	67.6	0.0	32.4			0.0	97.8	2.2								3.4	96.6	0.0			
TOTAL %	6.6	0.0	3.1			0.0	35.2	0.8			0.0	0.0	0.0			1.8	52.5	0.0			

PEAK HOUR
TURNING MOVEMENT VOLUMES
ALL VEHICLES
GRAND AVE. & HWMS EAST DRIVEWAY

LOCATION: Grand Ave. & East Drive (HWMS)
CITY: Haysville, Kansas
DATE: Tuesday, November 10, 2015
WEATHER: Partly Cloudy

DATA FILE: TM-Grand_E Dr.ppd
COLLECTED BY: C. Perez
OTHER:

ALL VEHICLES

START	END	SOUTHBOUND					WESTBOUND					NORTHBOUND					EASTBOUND					INT
TIME	TIME	LT	TH	RT	PED	TOTAL	LT	TH	RT	PED	TOTAL	LT	TH	RT	PED	TOTAL	LT	TH	RT	PED	TOTAL	TOTAL
7:00 AM	7:15 AM	4	0	0	0	4	0	43	44	0	87	0	0	0	0	0	4	54	0	0	58	149
7:15 AM	7:30 AM	30	0	1	0	31	0	45	79	0	124	0	0	0	0	0	7	89	0	0	96	251
7:30 AM	7:45 AM	8	0	0	0	8	0	26	4	0	30	0	0	0	0	0	2	44	0	0	46	84
7:45 AM	8:00 AM	2	0	0	0	2	0	41	4	0	45	0	0	0	0	0	0	33	0	0	33	80
8:00 AM	8:15 AM	3	0	0	0	3	0	22	5	0	27	0	0	0	0	0	0	28	0	0	28	58
8:15 AM	8:30 AM	3	0	0	0	3	0	21	4	0	25	0	0	0	0	0	0	27	0	0	27	55
8:30 AM	8:45 AM	1	0	0	0	1	0	14	1	0	15	0	0	0	0	0	0	17	0	0	17	33
8:45 AM	9:00 AM	1	0	0	0	1	0	19	3	0	22	0	0	0	0	0	1	16	0	0	17	40
2:30 PM	2:45 PM	2	0	0	0	2	0	36	19	0	55	0	0	0	0	0	0	18	0	0	18	75
2:45 PM	3:00 PM	21	0	2	0	23	0	28	29	0	57	0	0	0	0	0	4	76	0	0	80	160
3:00 PM	3:15 PM	17	0	1	0	18	0	32	9	0	41	0	0	0	0	0	0	34	0	0	34	93
3:15 PM	3:30 PM	6	0	1	0	7	0	24	2	0	26	0	0	0	0	0	1	36	0	0	37	70
3:30 PM	3:45 PM	2	0	1	0	3	0	18	5	0	23	0	0	0	0	0	1	49	0	0	50	76
3:45 PM	4:00 PM	4	0	0	0	4	0	45	3	0	48	0	0	0	0	0	0	62	0	0	62	114
4:00 PM	4:15 PM	3	0	0	0	3	0	42	2	0	44	0	0	0	0	0	0	42	0	0	42	89
4:15 PM	4:30 PM	2	0	0	0	2	0	38	1	0	39	0	0	0	0	0	0	47	0	0	47	88
4:30 PM	4:45 PM	2	0	2	0	4	0	31	2	0	33	0	0	0	0	0	1	63	0	0	64	101
4:45 PM	5:00 PM	3	0	1	0	4	0	40	8	0	48	0	0	0	0	0	0	52	0	0	52	104
5:00 PM	5:15 PM	7	0	1	0	8	0	47	14	0	61	0	0	0	0	0	3	50	0	0	53	122
5:15 PM	5:30 PM	4	0	0	0	4	0	29	6	0	35	0	0	0	0	0	1	56	0	0	57	96
5:30 PM	5:45 PM																					
5:45 PM	6:00 PM																					
6:00 PM	6:15 PM																					

GRAND TOTAL	125	0	10	0	135	0	641	244	0	885	0	0	0	0	0	25	893	0	0	918	1938
APPR %	92.6	0.0	7.4			0.0	72.4	27.6								2.7	97.3	0.0			
TOTAL %	6.4	0.0	0.5			0.0	33.1	12.6			0.0	0.0	0.0			1.3	46.1	0.0			
AM PK HR	7:00 AM		to	8:00 AM																	
HR TOTAL	44	0	1	0	45	0	155	131	0	286	0	0	0	0	0	13	220	0	0	233	564
PHF					0.363					0.577										0.607	0.562
APPR %	97.8	0.0	2.2			0.0	54.2	45.8								5.6	94.4	0.0			
TOTAL %	7.8	0.0	0.2			0.0	27.5	23.2			0.0	0.0	0.0			2.3	39.0	0.0			
PM PK HR	4:30 PM		to	5:30 PM																	
HR TOTAL	16	0	4	0	20	0	147	30	0	177	0	0	0	0	0	5	221	0	0	226	423
PHF					0.625					0.725										0.883	0.867
APPR %	80.0	0.0	20.0			0.0	83.1	16.9								2.2	97.8	0.0			
TOTAL %	3.8	0.0	0.9			0.0	34.8	7.1			0.0	0.0	0.0			1.2	52.2	0.0			

Tri-City School (USD 261)

1975 W. Grand Ave.
Haysville, Kansas 67060

APPENDIX C

- ***ITE* Trip Generation Statistical Data Sheets**

High School
(530)

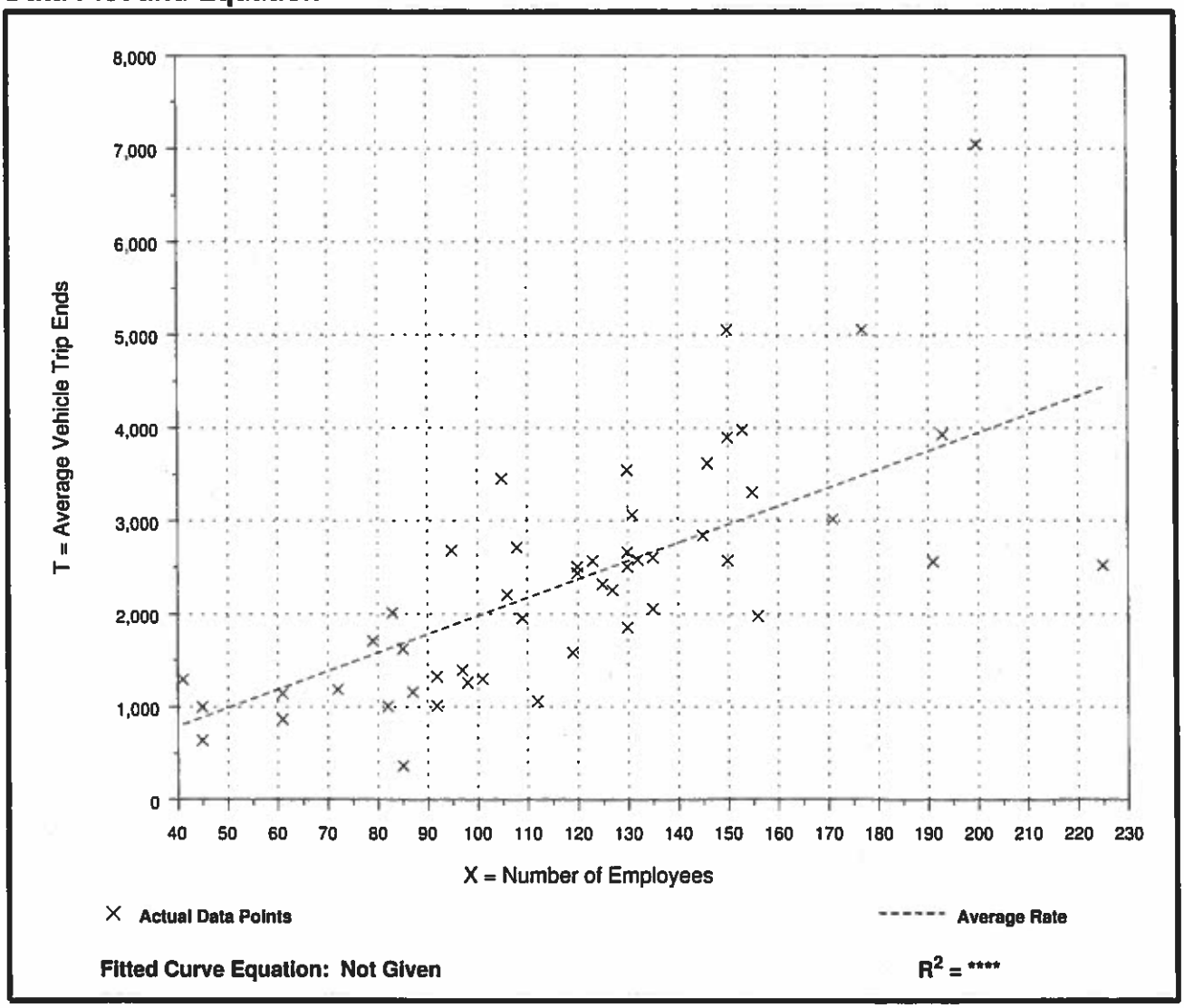
Average Vehicle Trip Ends vs: Employees
On a: Weekday

Number of Studies: 51
Avg. Number of Employees: 119
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
19.74	4.28 - 35.26	7.95

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2 = ****

High School
(530)

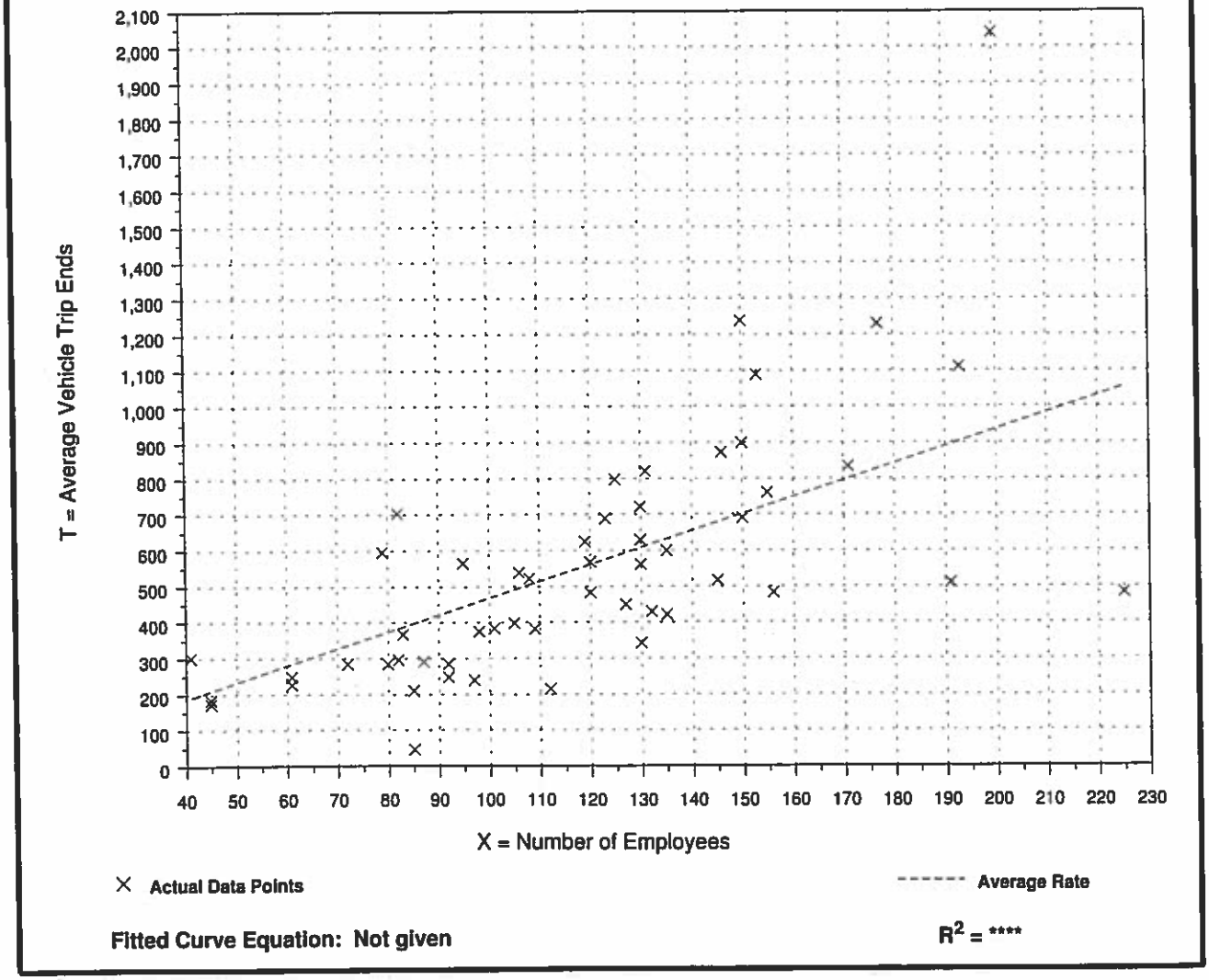
Average Vehicle Trip Ends vs: Employees
On a: Weekday,
A.M. Peak Hour

Number of Studies: 53
Avg. Number of Employees: 118
Directional Distribution: 70% entering, 30% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
4.68	0.54 - 10.20	2.88

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

High School
(530)

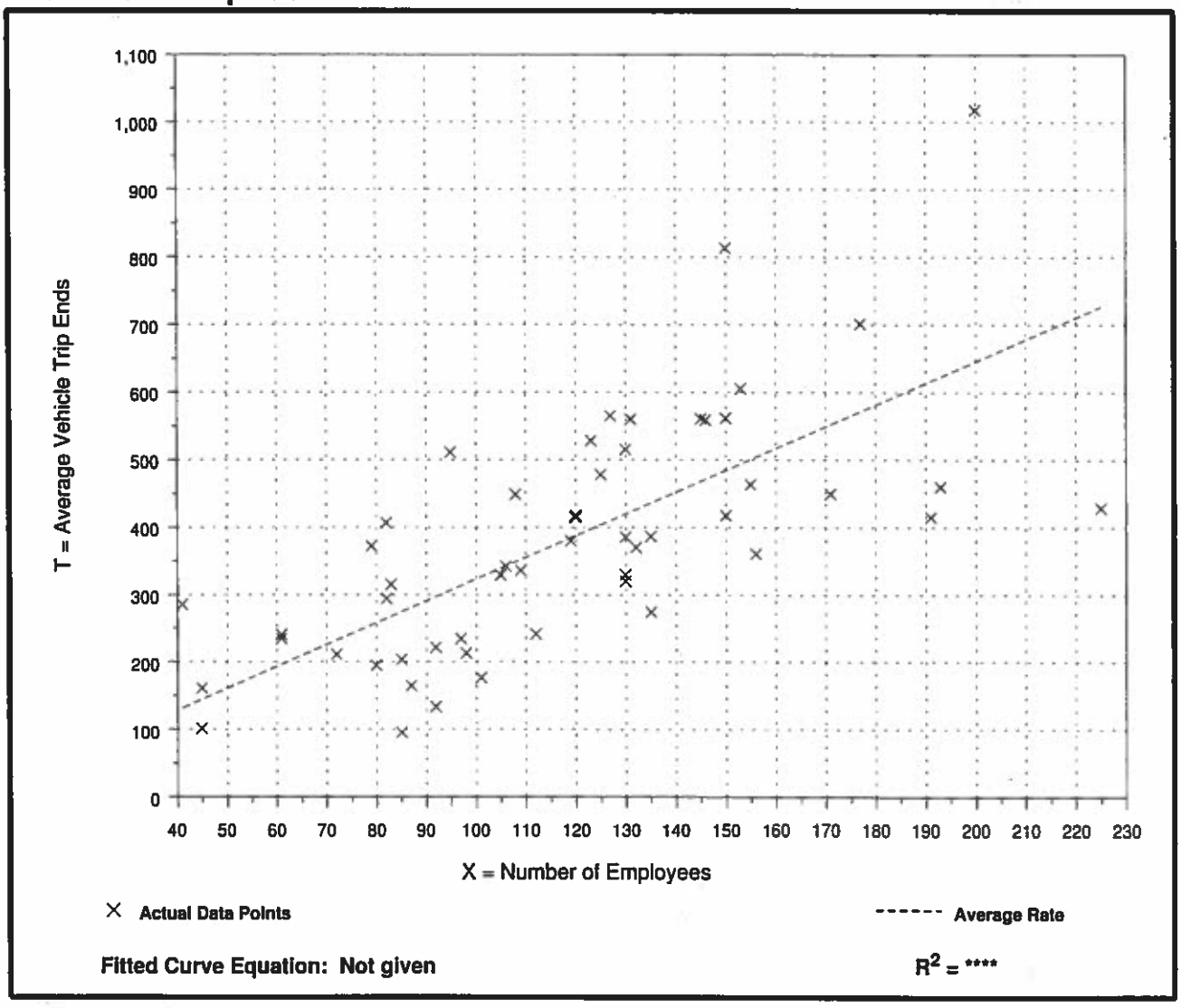
Average Vehicle Trip Ends vs: Employees
On a: Weekday,
P.M. Peak Hour of Generator

Number of Studies: 53
Avg. Number of Employees: 118
Directional Distribution: 31% entering, 69% exiting

Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
3.23	1.13 - 6.98	2.08

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

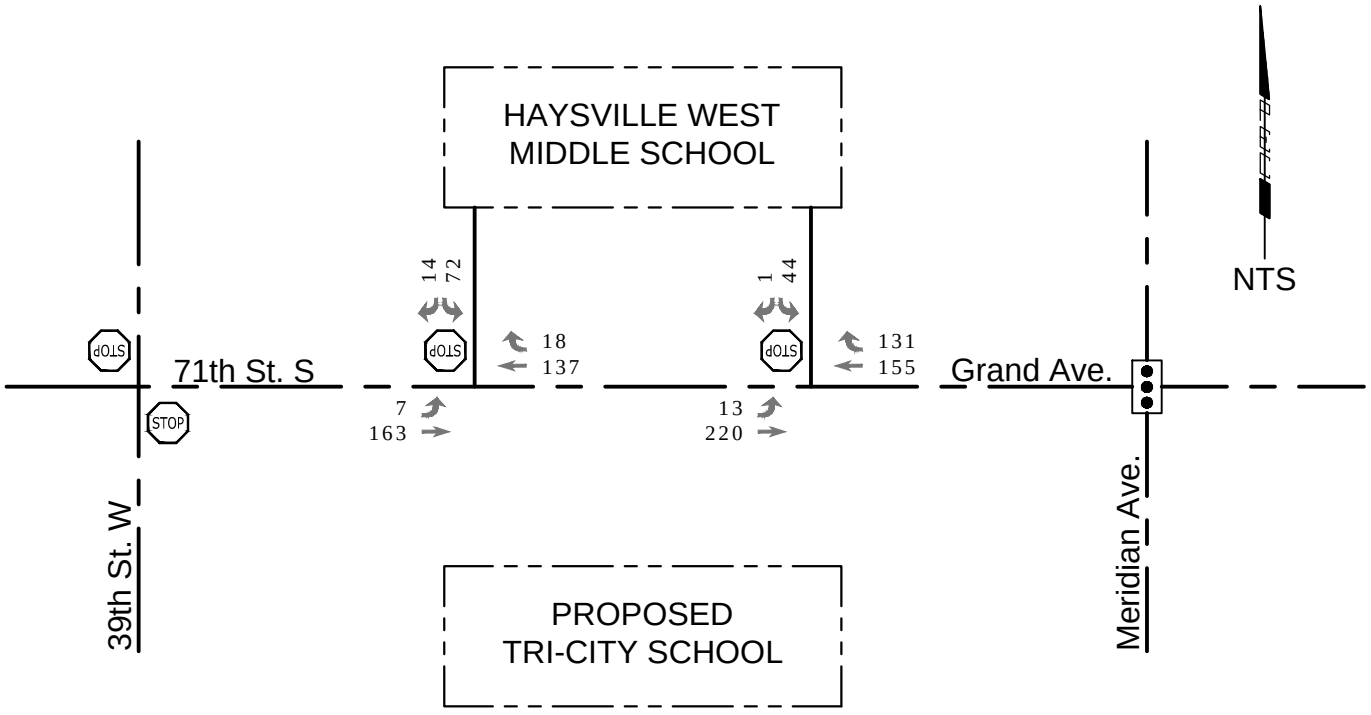
Tri-City School (USD 261)

1975 W. Grand Ave.
Haysville, Kansas 67060

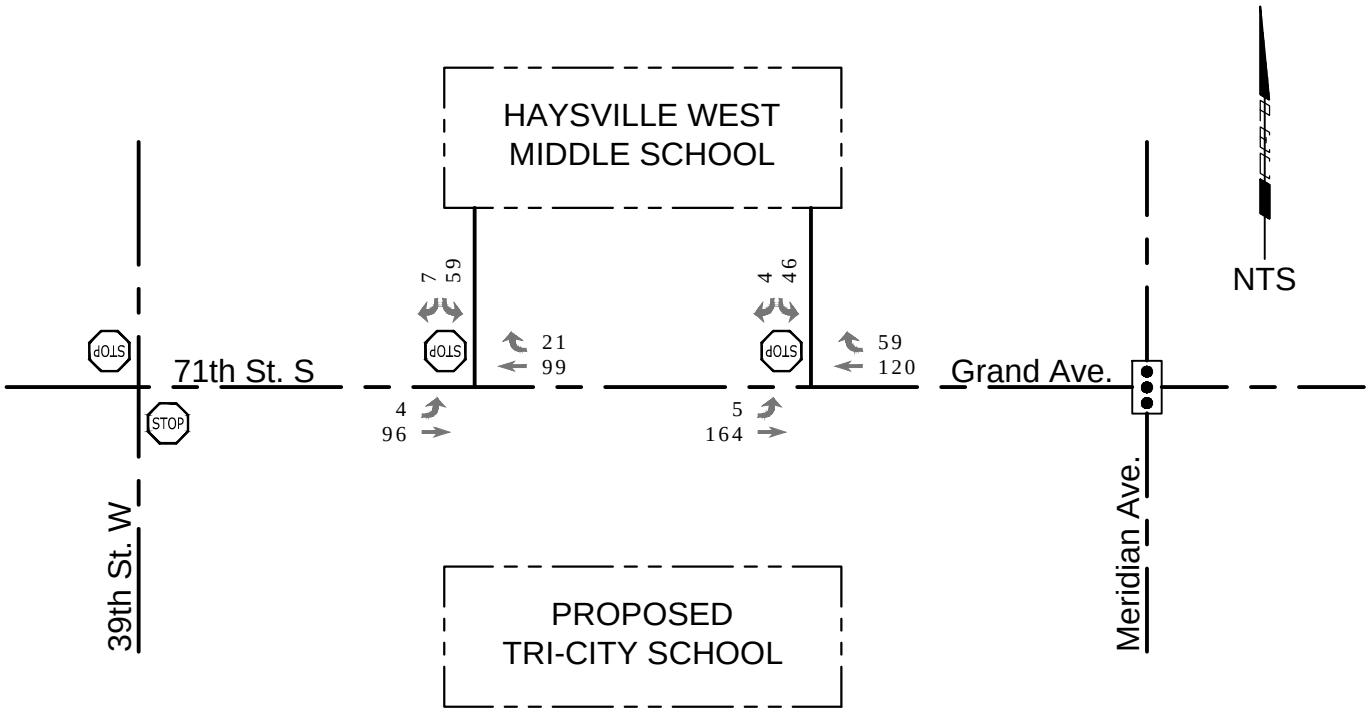
APPENDIX D

- **Proposed Traffic Volumes – Site Traffic**

EXISTING AM PEAK HOUR



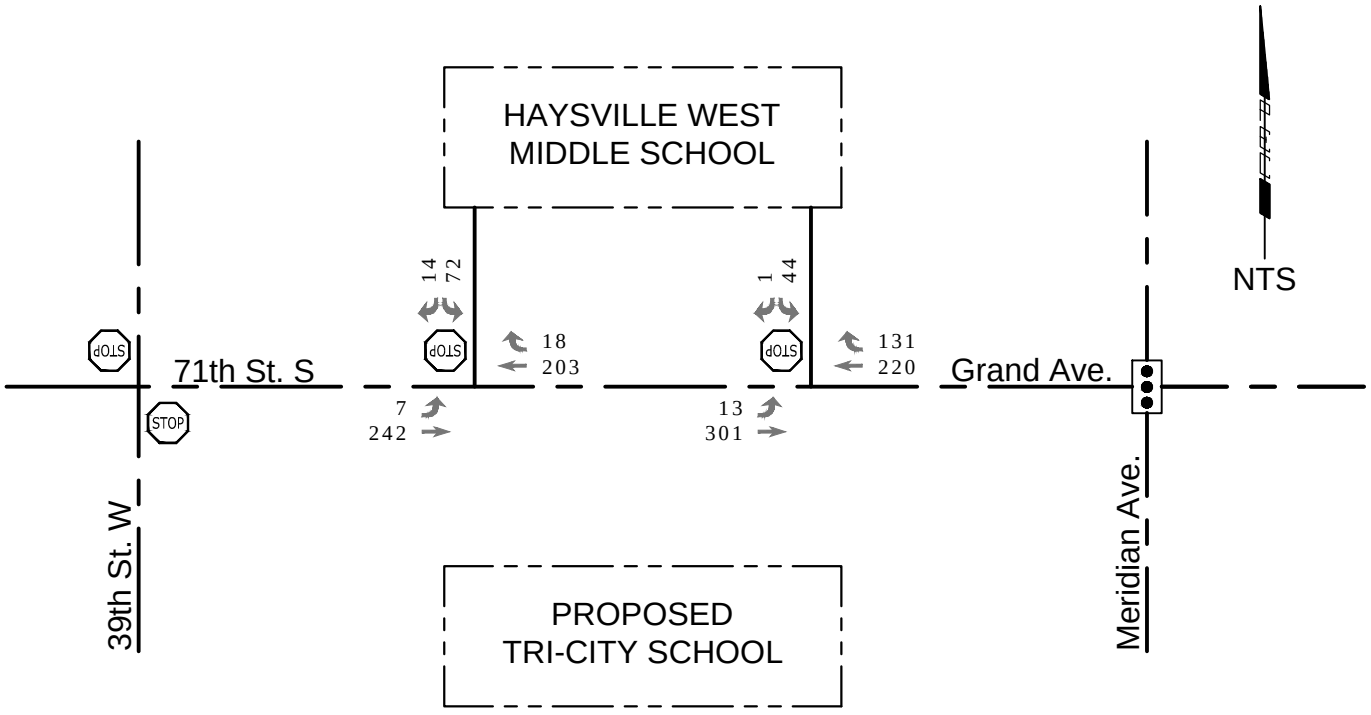
EXISTING PM PEAK HOUR



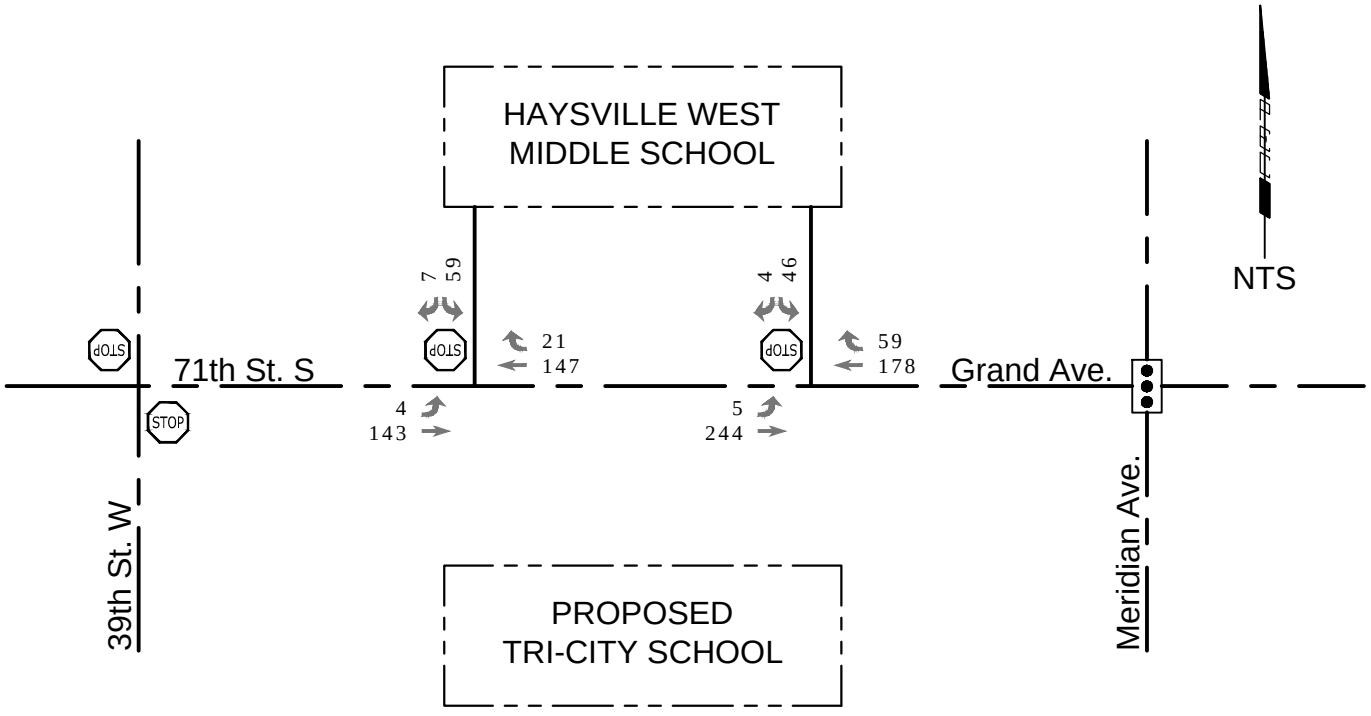
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PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
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WICHITA, KS 67202
316-262-2691
www.pec1.com

TRI-CITY SCHOOL
Haysville, Kansas
Existing Traffic Volumes

FUTURE AM PEAK HOUR



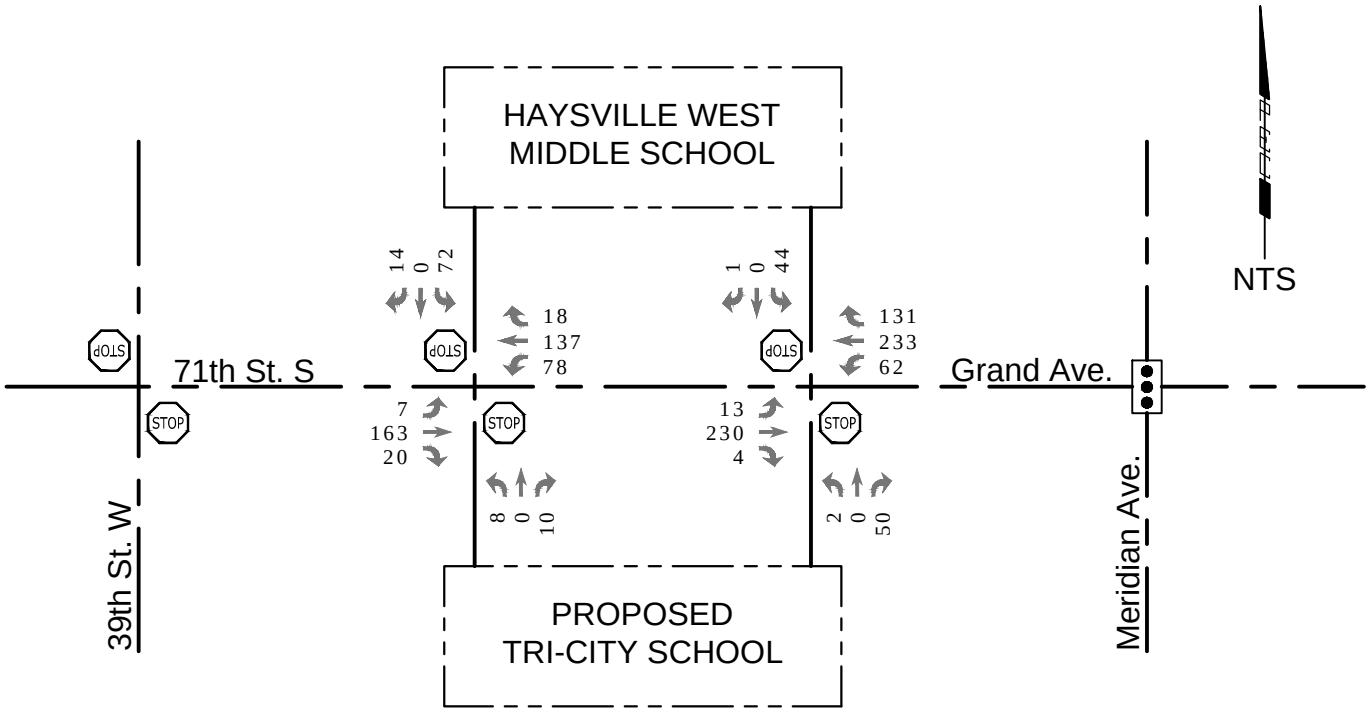
FUTURE PM PEAK HOUR



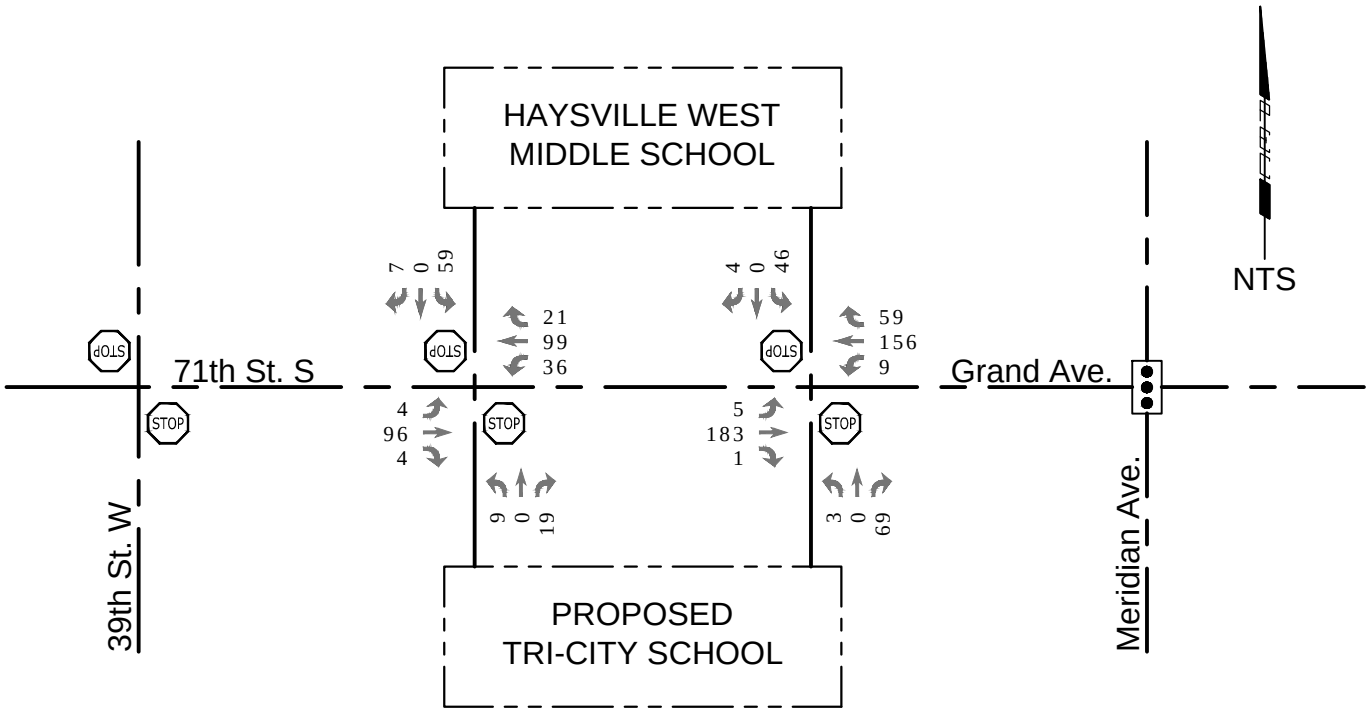
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PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
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WICHITA, KS 67202
316-262-2691
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TRI-CITY SCHOOL
Haysville, Kansas
Future Traffic Volumes

EXISTING + DEVELOPMENT AM PEAK HOUR



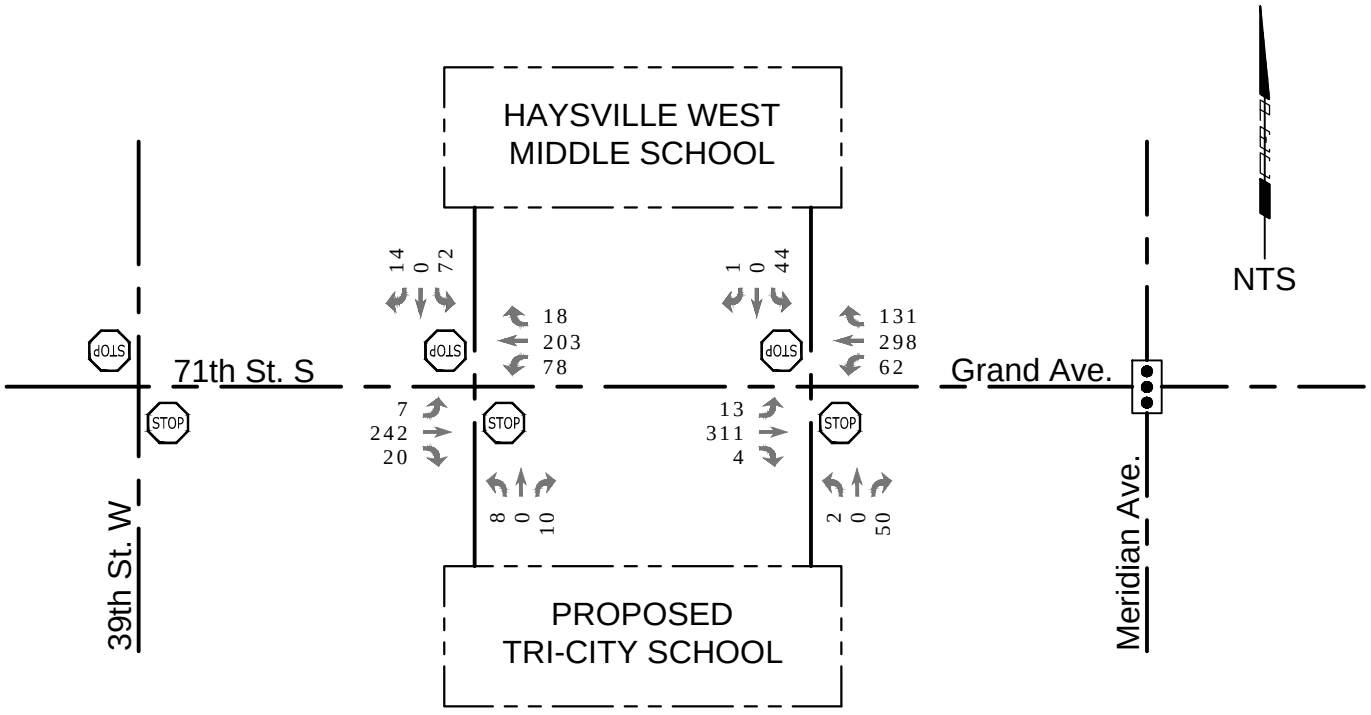
EXISTING + DEVELOPMENT PM PEAK HOUR



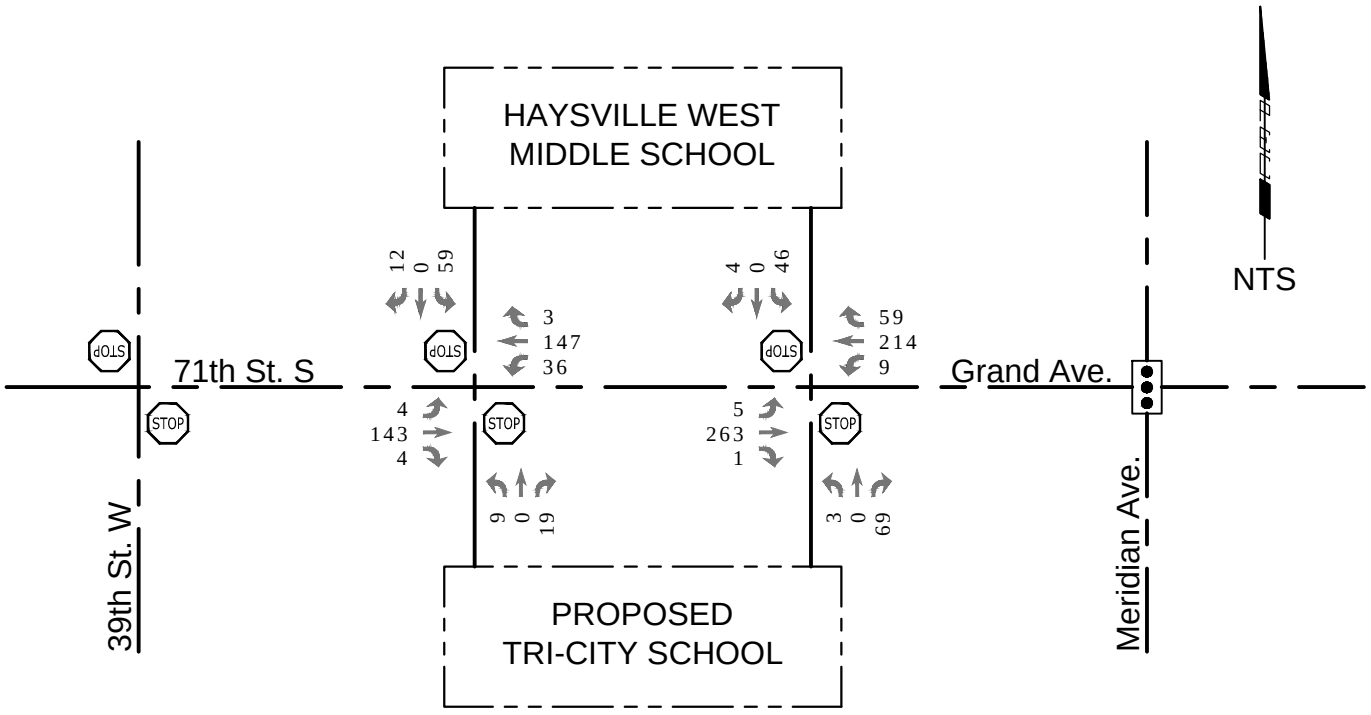
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FUTURE + DEVELOPMENT AM PEAK HOUR



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Haysville, Kansas
Future+Development Traffic Volumes

Tri-City School (USD 261)

1975 W. Grand Ave.
Haysville, Kansas 67060

APPENDIX E

- **Left Turn Analysis**

LEFT TURN ANALYSIS

West Driveway / Existing Traffic Volumes / AM Peak Hour

- With the opposing volume of 100 vph and 30% of the advancing volume turning left, the advancing volume would need to exceed 169 vph to warrant a left-turn lane.
- The advancing volume of 233 vph satisfies the warrants for a left-turn lane.

West Driveway / Existing Traffic Volumes / PM Peak Hour

- With the opposing volume of 100 vph and 20% of the advancing volume turning left, the advancing volume would need to exceed 194 vph to warrant a left-turn lane.
- The advancing volume of 156 vph does not satisfy the warrants for a left-turn lane.

West Driveway / Future Traffic Volumes / AM Peak Hour

- With the opposing volume of 262 vph and 30% of the advancing volume turning left, the advancing volume would need to exceed 143 vph to warrant a left-turn lane.
- The advancing volume of 299 vph satisfies the warrants for a left-turn lane.

West Driveway / Existing Traffic Volumes / PM Peak Hour

- With the opposing volume of 147 vph and 20% of the advancing volume turning left, the advancing volume would need to exceed 194 vph to warrant a left-turn lane.
- The advancing volume of 186 vph does not satisfy the warrants for a left-turn lane.

East Driveway / Existing Traffic Volumes / AM Peak Hour

- With the opposing volume of 234 vph and 20% of the advancing volume turning left, the advancing volume would need to exceed 194 vph to warrant a left-turn lane.
- The advancing volume of 426 vph satisfies the warrants for a left-turn lane.

East Driveway / Existing Traffic Volumes / PM Peak Hour

- With the opposing volume of 184 vph and 5% of the advancing volume turning left, the advancing volume would need to exceed 164 vph to warrant a left-turn lane.
- The advancing volume of 224 vph does not satisfy the warrants for a left-turn lane.

East Driveway / Future Traffic Volumes / AM Peak Hour

- With the opposing volume of 315 vph and 20% of the advancing volume turning left, the advancing volume would need to exceed 143 vph to warrant a left-turn lane.
- The advancing volume of 491 vph satisfies the warrants for a left-turn lane.

East Driveway / Existing Traffic Volumes / PM Peak Hour

- With the opposing volume of 264 vph and 5% of the advancing volume turning left, the advancing volume would need to exceed 301 vph to warrant a left-turn lane.
- The advancing volume of 282 vph does not satisfy the warrants for a left-turn lane.

Tri-City School (USD 261)

1975 W. Grand Ave.
Haysville, Kansas 67060

APPENDIX F

- **Intersection Analysis for Grand Ave. & West Driveway Intersection (Unsignalized)**
- **Intersection Analysis for Grand Ave. & East Driveway Intersection (Unsignalized)**

HCS 2010 Two-Way Stop Control Summary Report

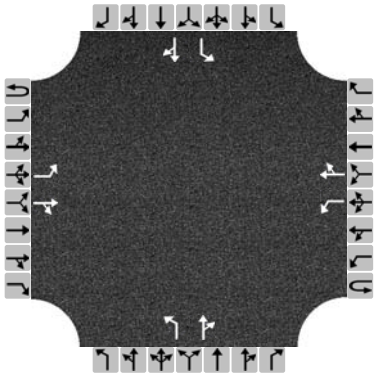
General Information

Analyst	SAC
Agency/Co.	PEC
Date Performed	12/5/2015
Analysis Year	2015
Time Analyzed	AM Peak (Existing)
Intersection Orientation	East-West
Project Description	Tri-City School

Site Information

Intersection	Grand Ave / West Drive
Jurisdiction	
East/West Street	Grand Ave
North/South Street	West Drive
Peak Hour Factor	0.66
Analysis Time Period (hrs)	1.00

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		1	1	0		1	1	0
Configuration		L		TR		L		TR		L		TR		L		TR
Volume (veh/h)		7	163	20		78	137	18		8	0	10		72	0	14
Percent Heavy Vehicles		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Undivided															
Median Storage																

Delay, Queue Length, and Level of Service

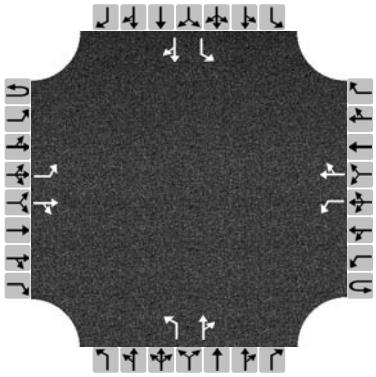
Flow Rate (veh/h)		11				118				12		15		109		21
Capacity		1325				1279				293		774		296		815
v/c Ratio		0.01				0.09				0.04		0.02		0.37		0.03
95% Queue Length		0.0				0.3				0.1		0.1		1.7		0.1
Control Delay (s/veh)		7.7				8.1				17.8		9.7		24.2		9.5
Level of Service (LOS)		A				A				C		A		C		A
Approach Delay (s/veh)	0.3				2.7				13.3				21.8			
Approach LOS	A				A				B				C			

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HCS 2010 Two-Way Stop Control Summary Report

General Information		Site Information	
Analyst	SAC	Intersection	Grand Ave / West Drive
Agency/Co.	PEC	Jurisdiction	
Date Performed	12/5/2015	East/West Street	Grand Ave
Analysis Year	2015	North/South Street	West Drive
Time Analyzed	PM Peak (Existing)	Peak Hour Factor	0.96
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00
Project Description	Tri-City School		

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		1	1	0		1	1	0
Configuration		L		TR		L		TR		L		TR		L		TR
Volume (veh/h)		4	96	4		36	99	21		9	0	19		59	0	7
Percent Heavy Vehicles		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Undivided															
Median Storage																

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)		4				38				9		20		61		7
Capacity		1454				1480				627		950		613		935
v/c Ratio		0.00				0.03				0.01		0.02		0.10		0.01
95% Queue Length		0.0				0.1				0.0		0.1		0.3		0.0
Control Delay (s/veh)		7.5				7.5				10.8		8.9		11.5		8.9
Level of Service (LOS)		A				A				B		A		B		A
Approach Delay (s/veh)	0.3				1.7				9.5				11.2			
Approach LOS	A				A				A				B			

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HCS 2010 Two-Way Stop Control Summary Report

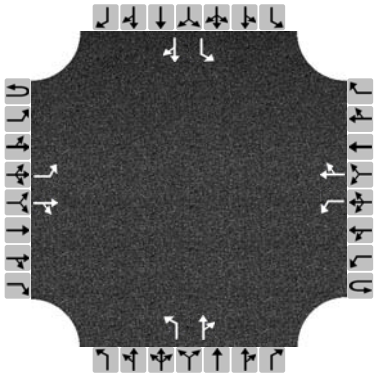
General Information

Analyst	SAC
Agency/Co.	PEC
Date Performed	12/5/2015
Analysis Year	2015
Time Analyzed	AM Peak (Existing)
Intersection Orientation	East-West
Project Description	Tri-City School

Site Information

Intersection	Grand Ave / East Drive
Jurisdiction	
East/West Street	Grand Ave
North/South Street	East Drive
Peak Hour Factor	0.56
Analysis Time Period (hrs)	1.00

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		1	1	0		1	1	0
Configuration		L		TR		L		TR		L		TR		L		TR
Volume (veh/h)		13	230	4		62	233	131		2	0	50		44	0	1
Percent Heavy Vehicles		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Undivided															
Median Storage																

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)		23				111				4		89		79		2
Capacity		931				1135				142		636		114		545
v/c Ratio		0.02				0.10				0.03		0.14		0.69		0.00
95% Queue Length		0.1				0.3				0.1		0.5		5.2		0.0
Control Delay (s/veh)		9.0				8.5				31.1		11.6		100.4		11.6
Level of Service (LOS)		A				A				D		B		F		B
Approach Delay (s/veh)	0.5				1.2				12.4				98.2			
Approach LOS	A				A				B				F			

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HCS 2010 Two-Way Stop Control Summary Report

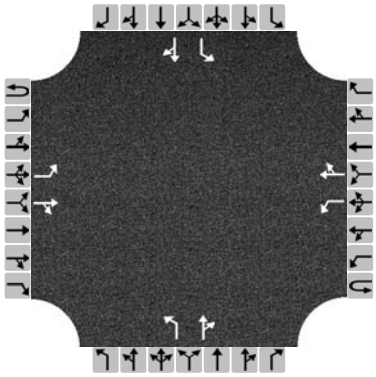
General Information

Analyst	SAC
Agency/Co.	PEC
Date Performed	12/5/2015
Analysis Year	2015
Time Analyzed	PM Peak (Existing)
Intersection Orientation	East-West
Project Description	Tri-City School

Site Information

Intersection	Grand Ave / East Drive
Jurisdiction	
East/West Street	Grand Ave
North/South Street	East Drive
Peak Hour Factor	0.87
Analysis Time Period (hrs)	1.00

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		1	1	0		1	1	0
Configuration		L		TR		L		TR		L		TR		L		TR
Volume (veh/h)		5	183	1		9	156	59		3	0	69		46	0	4
Percent Heavy Vehicles		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Right Turn Channelized	No				No				No				No			
Median Type	Undivided															
Median Storage																

Delay, Queue Length, and Level of Service

Flow Rate (veh/h)		6				10				3		79		53		5
Capacity		1312				1352				503		827		433		824
v/c Ratio		0.00				0.01				0.01		0.10		0.12		0.01
95% Queue Length		0.0				0.0				0.0		0.3		0.4		0.0
Control Delay (s/veh)		7.8				7.7				12.2		9.8		14.5		9.4
Level of Service (LOS)		A				A				B		A		B		A
Approach Delay (s/veh)	0.2				0.3				9.9				14.0			
Approach LOS	A				A				A				B			

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Tri-City School (USD 261)

1975 W. Grand Ave.
Haysville, Kansas 67060

APPENDIX G

- **Signal Warrants**

TRAFFIC SIGNAL WARRANT SUMMARY

City: **Haysville, KS** Engineer: **S. Canfield**
County: **Segwick** Date: **December 4, 2015**

Major Street: **Grand Ave** Lanes: **1** Major Approach Speed: **35**
Minor Street: **Driveways (Combined Volumes @ One Drive)** Lanes: **1** Minor Approach Speed: **20**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ 70% ☑ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied for eight hours. ☐ Yes ☑ No

Warrant 1 is also satisfied if both Condition A and Condition B are "80%" satisfied (should only be applied after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems). ☐ Yes ☑ No

Condition A - Minimum Vehicular Volume

Condition A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

100% Satisfied: ☐ Yes ☑ No
80% Satisfied: ☐ Yes ☑ No
70% Satisfied: ☐ Yes ☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)				Vehicles per hour on minor-street (one direction only)			
Major	**Minor**	**100%[a]**	**80%[b]**	**70%[c]**	**56%[d]**	**100%[a]**	**80%[b]**	**70%[c]**	**56%[d]**
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

[a] Basic Minimum hourly volume
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures
[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000
[d] May be used for combination of Conditions A and B after adequate trial of remeidal measureswhen the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Street	Eight Highest Hours							
	7-8 AM	4-5 PM	3-4 PM	2-3 PM	12:00 AM	12:00 AM	12:00 AM	12:00 AM
Major	519	403	355	348	0	0	0	0
Minor	131	57	30	116	0	0	0	0

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where Condition A is not satisfied and the traffic volume on a major street is so heavy that traffic on the minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

Applicable:	☐ Yes	☑ No
100% Satisfied:	☐ Yes	☑ No
80% Satisfied:	☐ Yes	☑ No
70% Satisfied:	☐ Yes	☑ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)				Vehicles per hour on minor-street (one direction only)			
Major	**Minor**	**100%[a]**	**80%[b]**	**70%[c]**	**56%d**	**100%[a]**	**80%[b]**	**70%[c]**	**56%d**
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic Minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

[d] May be used for combination of Conditions A and B after adequate trial of remeidal measureswhen the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Eight Highest Hours								
Street	**7-8 AM**	**4-5 PM**	**3-4 PM**	**2-3 PM**	12:00 AM	12:00 AM	12:00 AM	12:00 AM
Major	519	403	355	348	0	0	0	0
Minor	131	57	30	116	0	0	0	0

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
February 2015

City: **Haysville, KS** Engineer: **S. Canfield**
County: **Segwick** Date: **December 4, 2015**

Major Street: **Grand Ave** Lanes: **1** Major Approach Speed: **35**
Minor Street: **Driveways (Combined Volumes @ One Drive)** Lanes: **1** Minor Approach Speed: **20**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ Yes ☑ No

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

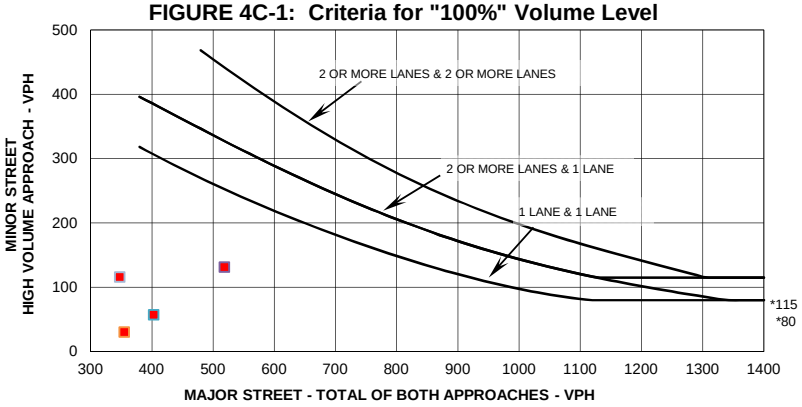
Applicable: ☑ Yes ☐ No
Satisfied: ☐ Yes ☑ No

100% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	519	131
4-5 PM	403	57
3-4 PM	355	30
2-3 PM	348	116

Plot four volume combinations on the applicable figure below.

FIGURE 4C-1: Criteria for "100%" Volume Level



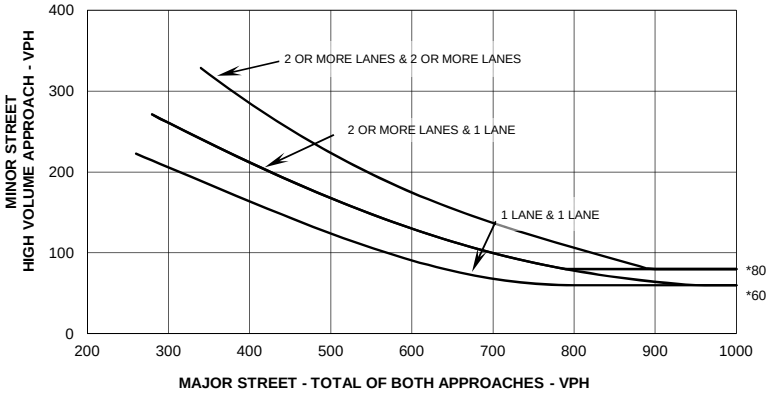
** Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

TRAFFIC SIGNAL WARRANT SUMMARY

City: **Haysville, KS** Engineer: **S. Canfield**
County: **Segwick** Date: **December 4, 2015**

Major Street: **Grand Ave** Lanes: **1** Major Approach Speed: **35**
Minor Street: **Driveways (Combined Volumes @ One Drive)** Lanes: **1** Minor Approach Speed: **20**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ 70% ☑ 100%

WARRANT 3 - PEAK HOUR

*If all three criteria are fulfilled **or** the plotted point lies above the appropriate line, then the warrant is satisfied.*

Applicable: ☑ Yes ☐ No
Satisfied: ☐ Yes ☑ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour 100% Volume		
Time	Major Vol.	Minor Vol.
7-8 AM	519	45

Peak Hour 70% Volume		
Time	Major Vol.	Minor Vol.

Criteria

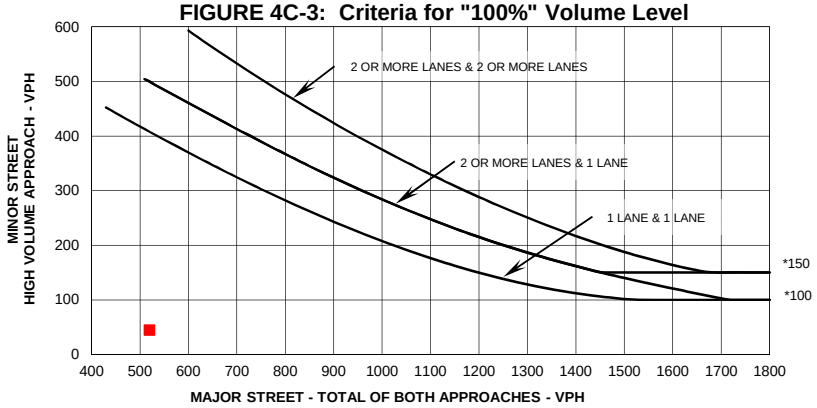
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*	1.6	
Fulfilled?: ☐ Yes ☑ No		

2. Volume on Minor Approach One-Direction *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*	45	
Fulfilled?: ☐ Yes ☑ No		

3. Total Intersection Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*	564	
Fulfilled?: ☐ Yes ☑ No		

Plot volume combination on the applicable figure below.

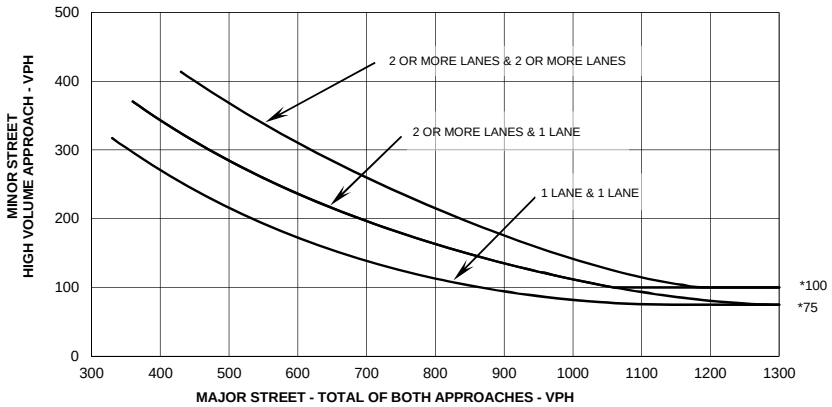
FIGURE 4C-3: Criteria for "100%" Volume Level



** Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

FIGURE 4C-4: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



** Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

TRAFFIC SIGNAL WARRANT SUMMARY

City: **Haysville, KS** Engineer: **S. Canfield**
County: **Segwick** Date: **November 18, 2015**

Major Street: **Grand Ave** Lanes: **1** Major Approach Speed: **35**
Minor Street: **Driveways (Combined Volumes @ One Drive)** Lanes: **1** Minor Approach Speed: **20**

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

CONCLUSIONS

Remarks:

WARRANTS SATISFIED:

	Met	Not Met
Warrant 1: Eight-Hour Vehicular Volume	☐	X
1A - Minimum Vehicular Volume	☐	X
1B - Interruption of Continuous Traffic	☐	X
1A/1B 80% Combination	☐	X
Warrant 2: Four-Hour Vehicular Volume	☐	X
Warrant 3: Peak Hour	☐	X

TRI-CITY SCHOOL

LEGEND

PROJECT AREA

NORTH

OPTION 1

1" = 40'-0"

0 40 80

SCALE IN FEET

DATE
BIDDING
10/12/2015
ADDENDUM NO. 1
10/30/2015

3500 north rock road
bldg. 500 wichita, ks 67226
316.634.1111 (p) 316.634.1016 (f)

PROFESSIONAL ENGINEERING CONSULTANTS P.A.
300 S.W. 29TH ST. TOPEKA, KANSAS 66611-2317
316-262-2691 www.pec1.com

HAYSVILLE USD 261
TRI-CITY SCHOOL
7337 S. MERIDIAN
HAYSVILLE, KANSAS

sheet

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Professional Engineering Consultants, P.A.
303 S. Topeka
Wichita, Kansas 67202
Phone (316)262-2691

USD 261 - GRAND AVE LEFT TURN LANE
HAYSVILLE, KS

PEC PROJECT NO. 35-15476-013

Prepared by: PEC
Estimate Date: 12/23/2015

CONCEPT ESTIMATE - OPTION 1 - TWO WAY DRIVES

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
	8" A.C. Pavement (5" Bit. Base)	1550	SY	$ 40.00	$ 62,000.00
	2" A.C. Mill & Overlay	1700	SY	$ 15.00	$ 25,500.00
	6" Reinf. Crushed Rock Base	2500	SY	$ 10.00	$ 25,000.00
	Gravel Shoulder	800	SY	$ 15.00	$ 12,000.00
	Linear Ditch Grading	1200	LF	$ 15.00	$ 18,000.00
	Driveway Culvert Pipe (24" RCP)	150	LF	$ 50.00	$ 7,500.00
	Unclassified Excavation	2000	CY	$ 5.00	$ 10,000.00
	Project Seeding	1	LS	$ 5,000.00	$ 5,000.00
	Erosion Control	1	LS	$ 7,500.00	$ 7,500.00
	Pavement Marking	1	LS	$ 10,000.00	$ 10,000.00
	Traffic Control	1	LS	$ 10,500.00	$ 10,500.00
	Site Clearing & Restoration	1	LS	$ 27,000.00	$ 27,000.00

Subtotal Construction Estimate	$ 220,000.00
10% Contingencies	$22,000.00
Total Construction Estimate	$ 242,000.00
30% Project Costs	$72,600.00
Total Project Costs	**$ 314,600.00**

* Estimate does NOT include right-of-way or easement acquisition or utility relocations

TRI-CITY SCHOOL

LEGEND

PROJECT AREA

NORTH

OPTION 2

1" = 40'-0"

0 40 80

SCALE IN FEET

DATE
BIDDING
10/12/2015
ADDENDUM NO. 1
10/30/2015

3500 north rock road
bldg 500 wichita, ks 67226
316.634.1111 (p) 316.634.1016 (f)

PROFESSIONAL ENGINEERING CONSULTANTS P.A.
300 SW 29TH ST TOPEKA, KS 66611-2317
316-262-2691 www.pec1.com

HAYSVILLE USD 261
TRI-CITY SCHOOL
7337 S. MERIDIAN
HAYSVILLE, KANSAS

sheet

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Professional Engineering Consultants, P.A.
303 S. Topeka
Wichita, Kansas 67202
Phone (316)262-2691

USD 261 - GRAND AVE LEFT TURN LANE
HAYSVILLE, KS

PEC PROJECT NO. 35-15476-013

Prepared by: PEC
Estimate Date: 12/23/2015

CONCEPT ESTIMATE - OPTION 2 - EAST DRIVE EXIT ONLY

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
	8" A.C. Pavement (5" Bit. Base)	1350	SY	$ 40.00	$ 54,000.00
	2" A.C. Mill & Overlay	1250	SY	$ 15.00	$ 18,750.00
	6" Reinf. Crushed Rock Base	1970	SY	$ 10.00	$ 19,700.00
	Gravel Shoulder	560	SY	$ 15.00	$ 8,400.00
	Linear Ditch Grading	1200	LF	$ 15.00	$ 18,000.00
	Driveway Culvert Pipe (24" RCP)	150	LF	$ 50.00	$ 7,500.00
	Unclassified Excavation	1750	CY	$ 5.00	$ 8,750.00
	Project Seeding	1	LS	$ 4,500.00	$ 4,500.00
	Erosion Control	1	LS	$ 6,500.00	$ 6,500.00
	Pavement Marking	1	LS	$ 8,500.00	$ 8,500.00
	Traffic Control	1	LS	$ 9,500.00	$ 9,500.00
	Site Clearing & Restoration	1	LS	$ 25,000.00	$ 25,000.00

Subtotal Construction Estimate	$ 189,100.00
10% Contingencies	$18,910.00
Total Construction Estimate	$ 208,010.00
30% Project Costs	$62,403.00
Total Project Costs	**$ 270,413.00**

* Estimate does NOT include right-of-way or easement acquisition or utility relocations