VANDERBURGH COUNTY SURVEYOR
Room 325 Civic Center Complex
Evansville, IN 457708
812-435-5210

March 20, 2006

NOTICE OF PLAN INSUFFICIENCIES

NORTHWOODS CHURCH

Dear Mr. True:

The county surveyor is reviewing the plan for Northwoods Church in an attempt to take it to the drainage board meeting Tuesday, March 21, 2006, if the following insufficiencies are adequately addressed by noon Tuesday:

1. The front half of the project area appears to discharge toward Green River Road without any detention. This appears to include the "future sanctuary," as well as substantial pavement for parking and driveways. Detention is required from project sites that will establish 10,000 square feet or more new hard surface.

2. There are no provisions shown for intercepting and appropriately conveying the accelerated and undetained run-off from the new pavement where the driveway enters Green River Road. This condition threatens to cast sediment-laden storm water out into the travel lanes of Green River Road.

3. Six percent (6%) grades across the south side of the paved parking lot will develop severely erosive velocities of accelerated storm water run-off that will be cast directly onto earthen embankments of the detention basin shown without appropriate and adequate erosion control (temporary and long-term). Additionally, one cannot expect the paving contractor to apply a perfectly uniform pavement surface, and there will be slight undulations and depressions that will act to collect the sheet run-off you apparently anticipate into more concentrated flows that will leave the edges of pavement and severely erode the detention basin at uncontrolled points of entry. That is exactly why curbing, surface inlets, or concrete flumes are preferred when collecting and conveying run-off from large areas of pavement.

4. The code requires concrete ribbon liners along the bottom of dry detention basins from points of storm water flow into the basin to the primary outlet. Your plan shown none. If a paved ribbon liner is not preferred, you may submit an alternative underdrain design to address chronic wetness in an appropriate fashion.

5. There is no design or location for an emergency outlet from the detention basin.

6. The outlet channel from the detention basin to the Green River Road side ditch is shown designed in such a way as to promote its inadequate construction with regard to a stabilized flow line, but especially with regard to the easternmost 100.0 feet where it will join Green River Road's ditch and there is a sanitary manhole at about the same elevation as the new swale. The plan does not give sufficient design detail to determine whether the manhole will interfere with or be within the swale or will be adversely affected by high flows in the swale. Additionally, more detail is needed to confirm the stable intersection of the new swale with the public roadside ditch.

7. There is no size given for the primary discharge pipe from the detention basin.

8. There is no proof given for the adequate sizing of the overflow swale from the basin to the roadside ditch. In other words, will the swale handle the heavier rainstorms without overflowing onto the property to the south?

9. The existing lake on the west side of the property is not addressed with regard to its current condition, outflow structures, potential adverse conditions caused by the lake especially to off-site properties, etc., so it cannot be regarded as a detention facility for the storm water you show discharging from new hard surfaces.

10. The "swale" carrying concentrated flow across the northwest portion of the parking lot thence into the existing pond is show discharging onto unprotected earthen surfaces.

11. The calculations submitted with the plan do not appear to take into account the entire project site and existing conditions across the entire site. Revise the calculations to reflect all existing and proposed surface conditions.

12. The erosion control plan shown as part of the drainage plan is insufficient to adequately address normal adverse conditions anticipated during and following construction of the facilities shown on the plan. If there is another erosion control plan to be approved by SWCD or the County Engineer before the drainage board approves the drainage plan, please submit a copy of that plan along with the revisions to address the other eleven (11) inadequacies listed above.

Bill Jeffers

NORTHWOOD CHURCH   JAN. 2006

UNDEVELOPED CONDITIONS

    IMPERVIOUS

        POLE BARN   3200 #   (DEMO)

        PARSONAGE   2100 #   (TO REMAIN)

        MISC BLDG's   1684 #   (DEMO)

        DRIVEWAY   8800 #   (TO REMAIN)

               15,784 #

                .36 ACRES

IMPERVIOUS	.36 A	$c = .92$	.33
GRASS	11.95 A	$c = .24$	2.82
total	12.31 A		3.20

$$3.2 / 12.31 = .26$$

$$C_{avg} = .26$$

$$t_c = K (LNS^{-.-})^{.467}$$

$$t_c = .83 \left[(600)(.2)(.07)^{-.-} \right]^{.467}$$

$$= 17.6 \text{ MIN.}$$

10 YR RET, 20 MIN $I = 4"/HR$

$$Q = (.26)(4)(12.31)$$

$$Q = \underline{12.80 \text{ CFS}}$$

DEVELOPED   RUN-OFF
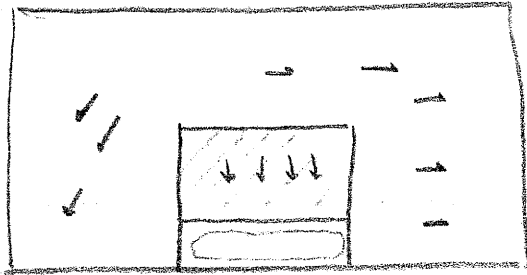
RUN OFF @ SURROUNDING AREA TO REMAIN

AS EXISTING:

25 YR   20 MIN $S = 4.4''/HR$

$Q = (.26)(4.4)(10) = 11.44$ CFS

TOTAL UNDEVELOPED RUN-OFF $Q = 12.80$ CFS

$$\begin{array}{r} 12.80 \\ \underline{(11.44)} \\ 1.36 \text{ CFS} \end{array}$$

MAX DISCH FROM BASIN = $\underline{1.36}$ CFS

DEVELOPED RUN-OFF DIRECTED TO BASIN

BLDG. & PAVING   101,100 #   2.31 ACRES

$C = .92$ $t_c = 5$ MIN.

PEAK STORAGE RATE   .30 ACRES-FT

13,068 FT³

RESTRICTED DISCH.

$$Q = 1.36 \text{ CFS}$$

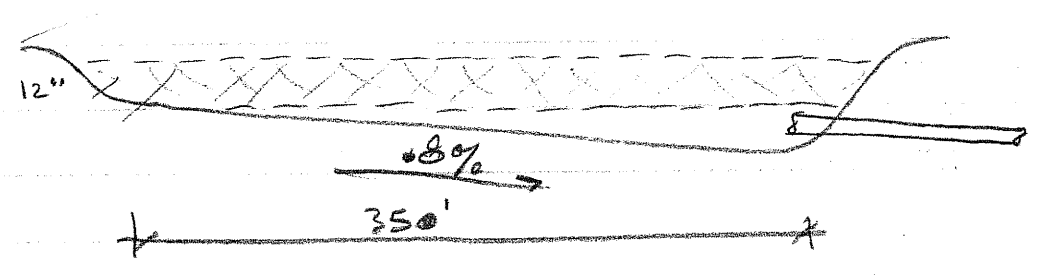$$1.36 = (.30)(A)\sqrt{(2)(32)(2)}$$

$$1.36 = 3.39 \, A$$

$$A = .40 \text{ FL}^2$$

$$A = \pi r^2$$

$$r = \sqrt{\frac{A}{\pi}} = \sqrt{\frac{.40}{3.14}}$$

$$r = .356'$$

$$D = .7136'$$

$$D = \underline{9''} \quad (\text{ORIFICE DISCH SIZE})$$

13,000   44# REQ's - 6# =   38#
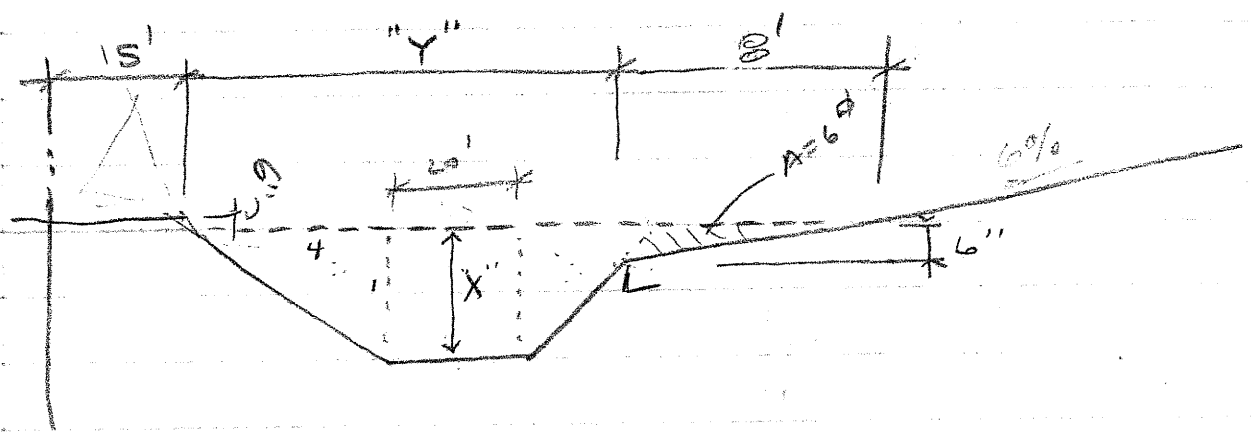
"X"   = 18"
           $(\frac{1}{2})$ (1.5) (6) x2 = TRIANG AREA = 9 #
           36 - 9 = 27#
                27 ÷ 1.5 = 18'
        Y = 30'

Project __NORTH WOOD__   Detention Facility Design Return Period __25__ yrs.

Designer __LANDMARK__   Release Rate Return Period _____ __10__ yrs.

Watershed Area __2.31__ acres

Time of Concentration (undeveloped watershed) __20__ minutes

Rainfall Intensity (i_U) __4.0__ inches/hr

Undeveloped Runoff Coefficient (C_U) __.26__

Undeveloped Runoff Rate ($O = C_U i_U A_U$) __12.80 - 11.44 = 1.36__ cfs

Developed Runoff Coefficient (C_D) __.92__

Storm Duration t_d (hrs)	Rainfall Intensity i_d (inches/hr)	Inflow Rate $I(t_d)$ $(C_D i_d A_D)$ (cfs)	Outflow Rate O $(C_U i_U A_U)$	Storage Rate $I(t_d) - O$ (cfs)	Required Storage $\left[I(t_d) - O\right]\frac{t_d}{12}$ (acre-ft)
		2.13			
0.17	5.925	12.62	1.36	11.26	.16
0.33	4.571	9.74	"	8.38	.23
0.50	3.646	7.76	"	6.40	.27
0.67	3.123	6.66	"	5.30	.30
0.83	2.601	5.54	"	4.18	.29
1.0	2.078	4.43	"	3.07	.25
1.5					
2.0					
3.0					
4.0					
5.0					
6.0					
7.0					
8.0					
9.0					
10.0					

Figure 6.2.2
Computation Sheet for Detention Storage Calculations Using the Rational Method