



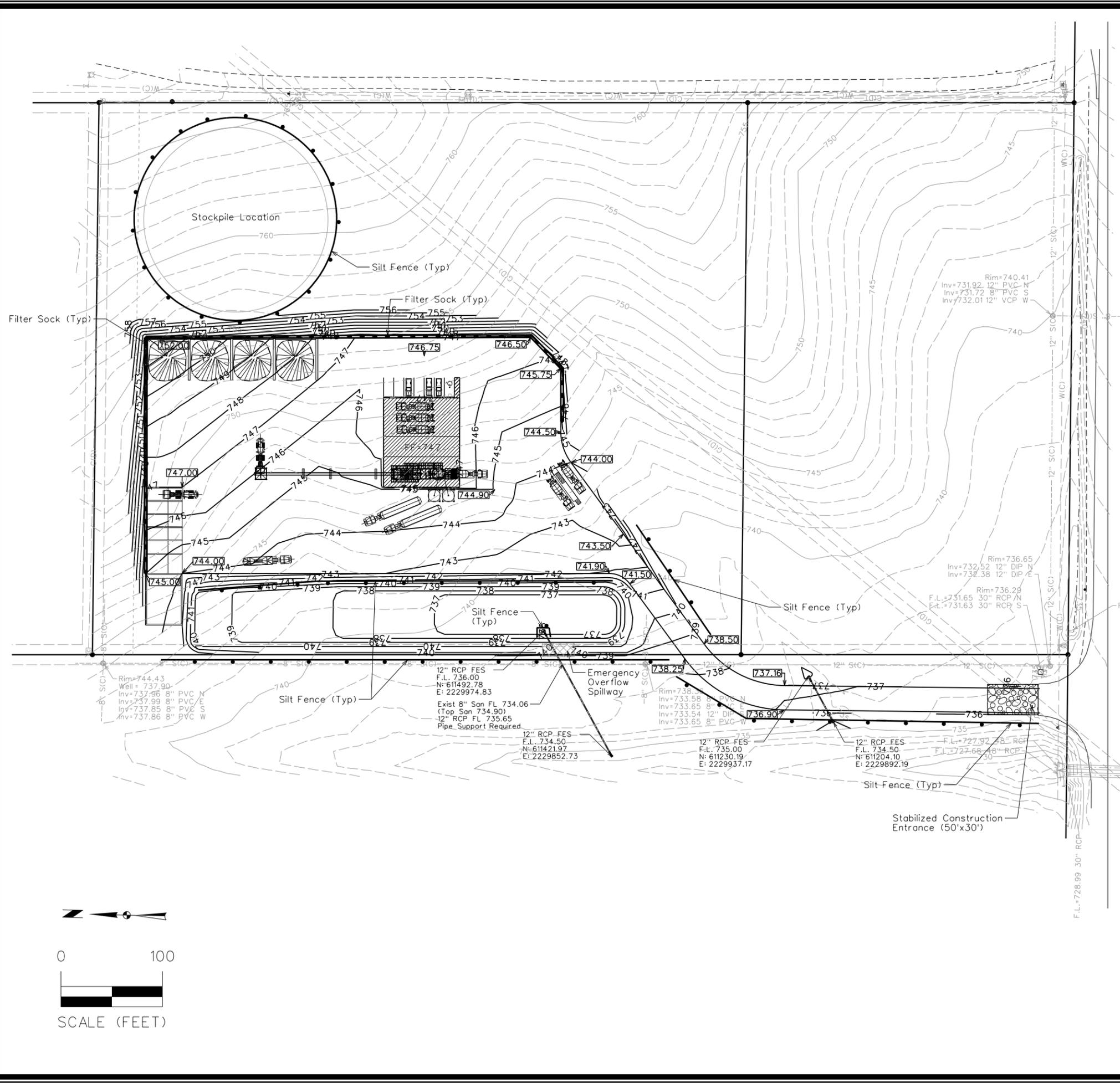
110 N. Poplar Street • PO Box 218 • West Branch, Iowa 52358
(319) 643-5888 • Fax (319) 643-2305 • www.westbranchiowa.org • city@westbranchiowa.org

PLANNING AND ZONING COMMISSION MEETING
Tuesday, June 20, 2017 • 7:00 p.m.
West Branch City Council Chambers, 110 N. Poplar St.
Council Quorum May Be Present

1. Call to Order
2. Roll Call
3. Approve Agenda/Consent Agenda/Move to action.
4. Public Hearing/Non-Consent Agenda
 - a. Approve Croell Redi-Mix site plan./Move to action.
 - b. John Fuller - Update on Comprehensive Plan Review Process.
5. City Staff Reports
6. Comments from Chair and Commission Members
7. The next regularly-scheduled Planning and Zoning Commission Meeting – July 25, 2017
at 7:00 p.m.
8. Adjourn

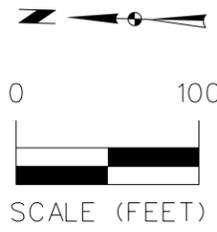
Planning & Zoning Commission Members: Chair John Fuller, Vice Chair Ryan Bowers, LeeAnn Aspelmeier, Sally Peck, Gary Slach, Emilie Walsh, Tom Dean • **Zoning Administrator:** Terry Goerdts • **Deputy City Clerk:** Leslie Brick
Mayor: Roger Laughlin • **Council Members:** Jordan Ellyson, Colton Miller, Brian Pierce, Tim Shields, Mary Beth Stevenson
City Administrator/Clerk: Vacant • **Fire Chief:** Kevin Stoolman • **Library Director:** Nick Shimmin
Parks & Rec Director: Melissa Russell • **Police Chief:** Mike Horihan • **Public Works Director:** Matt Goodale

5/31/2017 2:28:11 PM
 L:\Projects\1160878 - Croell Site Plan West Branch\1160878_02_grading_plan.dgn
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POLLUTION PREVENTION NOTES

- A. POLLUTION PREVENTION AND EROSION PROTECTION**
1. CODE COMPLIANCE: THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH ALL POTENTIAL POLLUTION AND SOIL EROSION CONTROL REQUIREMENTS OF THE IOWA CODE, THE IOWA DEPARTMENT OF NATURAL RESOURCES (IDNR) NPDES PERMIT, THE U.S. CLEAN WATER ACT AND ANY LOCAL ORDINANCES. THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO PROTECT AGAINST EROSION AND POLLUTION FROM THIS PROJECT SITE AND ALL OFF-SITE BORROW OR DEPOSIT AREAS DURING PERFORMANCE OR AS A RESULT OF PERFORMANCE.
 2. DAMAGE CLAIMS: THE CONTRACTOR WILL HOLD THE OWNER AND ARCHITECT / ENGINEER HARMLESS FROM ANY AND ALL CLAIMS OF ANY TYPE WHATSOEVER RESULTING FROM DAMAGES TO ADJOINING PUBLIC OR PRIVATE PROPERTY, INCLUDING REASONABLE ATTORNEY FEES INCURRED TO OWNER, FURTHER, IF THE CONTRACTOR FAILS TO TAKE NECESSARY STEPS TO PROMPTLY REMOVE EARTH SEDIMENTATION OR DEBRIS WHICH COMES ONTO ADJOINING PUBLIC OR PRIVATE PROPERTY, THE OWNER MAY, BUT NEED NOT, REMOVE SUCH ITEMS AND DEDUCT THE COST THEREOF FROM AMOUNTS DUE TO THE CONTRACTOR.
- B. STORM WATER DISCHARGE PERMIT**
1. THIS PROJECT REQUIRES COVERAGE UNDER THE NPDES GENERAL PERMIT NO. 2 FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES FROM THE IDNR, AS REQUIRED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THE GENERAL CONTRACTOR AND ALL SUBCONTRACTORS ARE RESPONSIBLE FOR COMPLIANCE WITH AND FULFILLMENT OF ALL REQUIREMENTS OF THE NPDES GENERAL PERMIT NO. 2 INCLUDING CREATING OR MAINTAINING THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND POSSIBLY OBTAINING THE GENERAL PERMIT COVERAGE FROM THE IDNR.
 2. ALL DOCUMENTS RELATED TO THE STORM WATER DISCHARGE PERMIT, INCLUDING, BUT NOT LIMITED TO, THE NOTICE OF INTENT, PROOF OF PUBLICATIONS, DISCHARGE AUTHORIZATION LETTER, CURRENT SWPPP, SITE INSPECTION LOG, AND OTHER ITEMS, SHALL BE KEPT ON SITE AT ALL TIMES AND MUST BE PRESENTED TO REGIONAL AGENCIES UPON REQUEST. FAILURE TO COMPLY WITH THE NPDES PERMIT REQUIREMENTS IS A VIOLATION OF THE CLEAN WATER ACT AND THE CODE OF IOWA.
 3. A "NOTICE OF DISCONTINUATION" MUST BE FILED WITH THE IDNR UPON FINAL STABILIZATION OF THE DISTURBED SITE AND REMOVAL OF ALL TEMPORARY EROSION CONTROL MEASURES. ALL PLANS, INSPECTION REPORTS, AND OTHER DOCUMENTS MUST BE RETAINED FOR A PERIOD OF THREE YEARS AFTER PROJECT COMPLETION. THE CONTRACTOR SHALL RETAIN A RECORD COPY AND PROVIDE THE ORIGINAL DOCUMENTS TO THE OWNER UPON PROJECT ACCEPTANCE AND/OR SUBMITTAL OF THE NOTICE OF DISCONTINUATION.
- C. POLLUTION PREVENTION PLAN:**
1. THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IS A SEPARATE DOCUMENT IN ADDITION TO THESE PLAN DRAWINGS. THE CONTRACTOR SHOULD REFER TO THE SWPPP FOR ADDITIONAL REQUIREMENTS AND MODIFICATIONS TO THE POLLUTION PREVENTION PLAN MADE DURING CONSTRUCTION.
 2. THE SWPPP ILLUSTRATES GENERAL MEASURES AND BEST MANAGEMENT PRACTICES (BMP) FOR COMPLIANCE WITH THE PROJECT'S NPDES PERMIT. EROSION AND EROSION CONTROL MEASURES REQUIRED AS A RESULT OF CONSTRUCTION ACTIVITIES ARE THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY, NOTE AND IMPLEMENT. ADDITIONAL BMP'S FROM THOSE SHOWN ON THE PLAN MAY BE REQUIRED.
 3. THE SWPPP AND SITE MAP SHOULD BE EXPEDITIOUSLY REVISED TO REFLECT CONSTRUCTION PROGRESS AND CHANGES AT THE PROJECT SITE.
 4. THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH ALL REQUIREMENTS OF THE GENERAL PERMIT AND SWPPP, INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING BMP'S UNLESS INFEASIBLE OR NOT APPLICABLE:
 - a. UTILIZE OUTLET STRUCTURES THAT WITHDRAW WATER FROM THE SURFACE WHEN DISCHARGING FROM BASINS, PROVIDE AND MAINTAIN NATURAL BUFFERS AROUND SURFACE WATERS, DIRECT STORM WATER TO VEGETATED AREAS TO INCREASE SEDIMENT REMOVAL AND MAXIMIZE STORM WATER INFILTRATION, AND MINIMIZE SOIL COMPACTION.
 - b. INSTALL PERIMETER AND FINAL SEDIMENT CONTROL MEASURES SUCH AS SILT BARRIERS, DITCH CHECKS, DIVERSION BERMS, OR SEDIMENTATION BASINS DOWNSTREAM OF SOIL DISTURBING ACTIVITIES PRIOR TO SITE CLEARING AND GRADING OPERATIONS.
 - c. PRESERVE EXISTING VEGETATION IN AREAS NOT NEEDED FOR CONSTRUCTION AND LIMIT TO A MINIMUM THE TOTAL AREA DISTURBED BY CONSTRUCTION OPERATIONS AT ANY TIME.
 - d. MAINTAIN ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES IN WORKING ORDER, INCLUDING, REPAIRING, REPLACEMENT, AND SEDIMENT REMOVAL THROUGHOUT THE PERMIT PERIOD. CLEAN OR REPLACE SILT CONTROL DEVICES WHEN THE MEASURES HAVE LOST 50% OF THEIR ORIGINAL CAPACITY.
 - e. INSPECT THE PROJECT AREA AND CONTROL DEVICES (BY QUALIFIED PERSONNEL ASSIGNED BY THE CONTRACTOR) EVERY SEVEN CALENDAR DAYS. RECORD THE FINDINGS OF THE INSPECTIONS AND ANY RESULTING ACTIONS IN THE SWPPP WITH A COPY SUBMITTED WEEKLY TO THE OWNER OR ENGINEER DURING CONSTRUCTION. REVISE THE SWPPP AND IMPLEMENT ANY RECOMMENDED MEASURES WITHIN 7 DAYS.
 - f. PREVENT ACCUMULATION OF EARTH AND DEBRIS FROM CONSTRUCTION ACTIVITIES ON ADJOINING PUBLIC OR PRIVATE PROPERTIES, INCLUDING STREETS, DRIVEWAYS, SIDEWALKS, DRAINAGEWAYS, OR UNDERGROUND SEWERS. REMOVE ANY ACCUMULATION OF EARTH OR DEBRIS IMMEDIATELY AND TAKE REMEDIAL ACTIONS FOR FUTURE PREVENTION.
 - g. INSTALL NECESSARY CONTROL MEASURES SUCH AS SILT BARRIERS, EROSION CONTROL MATS, MULCH, DITCH CHECKS OR RIPRAP AS SOON AS AREAS REACH THEIR FINAL GRADES AND AS CONSTRUCTION OPERATIONS PROGRESS TO ENSURE CONTINUOUS RUNOFF CONTROL. PROVIDE INLET AND OUTLET CONTROL MEASURES AS SOON AS STORM SEWERS ARE INSTALLED.
 - h. RESPREAD A MINIMUM OF 4 INCHES OF TOPSOIL (INCLUDING TOPSOIL FOUND IN SOD) ON ALL DISTURBED AREAS, EXCEPT WHERE PAVEMENT, BUILDINGS OR OTHER IMPROVEMENTS ARE LOCATED.
 - i. STABILIZE UNDEVELOPED, DISTURBED AREAS WITH MULCH, TEMPORARY SEED MIX, PERMANENT SEED MIX, OR SOD AS SOON AS PRACTICAL UPON COMPLETION OR DELAY OF GRADING OPERATIONS. INITIATE STABILIZATION MEASURES NO LATER THAN 14 CALENDAR DAYS AFTER CONSTRUCTION ACTIVITY HAS FINISHED OR IS PLANNED TO BE DELAYED MORE THAN 21 CALENDAR DAYS.
 - j. COORDINATE LOCATIONS OF STAGING AREAS WITH THE OWNER AND RECORD IN THE SWPPP. UNLESS NOTED OTHERWISE, STAGING AREAS SHOULD CONTAIN THE FOLLOWING: JOB TRAILERS, FUELING / VEHICLE MAINTENANCE AREA, TEMPORARY SANITARY FACILITIES, MATERIALS STORAGE, AND CONCRETE WASHOUT FACILITY. CONTROL RUNOFF FROM STAGING AREAS WITH DIVERSION BERMS AND/OR SILT BARRIERS AND DIRECT TO A SEDIMENT BASIN OR OTHER CONTROL DEVICE WHERE POSSIBLE. CONCRETE WASHOUT MUST BE CONTAINED ONSITE.
 - k. REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AND SITE WASTE PRIOR TO FILING OF THE "NOTICE OF DISCONTINUATION".



CROELL REDI-MIX SITE PLAN
GRADING AND EROSION CONTROL PLAN
SNYDER & ASSOCIATES, INC.
 WEST BRANCH, IOWA
 5005 BOWLING STREET S.W.
 CEDAR RAPIDS, IA 52404
 319-362-9394 | www.snyder-associates.com

MARK	REVISION	TAC	DATE	BY
Engineer: LMC	Checked By:		05-31-17	1"=100'
Technician: DJD	Date:		1160878	Sheet 2

Project No: 1160878
Sheet 2



City of West Branch
110 N. Poplar Street
West Branch, IA 52358

March 14, 2016

SITE PLAN REVIEW CHECKLIST

Project Name Croell Redi-Mix

Engineer Lacy Croell, P.E.

Reviewer _____

Reviewed Date _____

1. SITE PLAN

A. Site plans shall only be required whenever any person proposes to place any structure for which a building permit is required under any other section of this Code, on any tract or parcel of and within any district of the West Branch Zoning Ordinance, and for any use, except one and two family dwellings.

2. DESIGN STANDARDS

- A. The design of the proposed improvements shall make adequate provisions for surface and subsurface drainage, for connections to water and sanitary sewer lines, each so designed as to neither overload existing public utility lines nor increase the danger of erosion, flooding, landslide, or other endangerment of adjoining or surrounding property
- B. The proposed improvements shall be designed and located within the property in such manner as not to unduly diminish or impair the use and enjoyment of adjoining property and to this end shall minimize the adverse effects on such adjoining property from automobile headlights, illumination of required perimeter yards, refuse containers, and impairment of light and air.
- C. The proposed development shall have such entrances and exits upon adjacent streets and such internal traffic circulation pattern as will not unduly increase congestion on adjacent or surrounding public streets
- D. The proposed development shall conform to all applicable provisions of the Code of Iowa, as amended, Iowa Statewide Urban Design and Specifications (SUDAS), Iowa Stormwater Management Manual and all applicable provisions of the Code of Ordinances of the City of West Branch, as amended

Veenstra & Kimm, Inc.
860 22nd Avenue, Suite 4
Coralville, Iowa 52241
319-466-1000



SITE PLAN:

- 1. Prepared by a licensed Engineer or Land Surveyor YES NO
- 2. Date of preparation, North point and scale no smaller than 1"=100'.
Comments: YES NO
- 3. Legal description and address of the property to be developed.
Comments: YES NO
- 4. Name and address of the record property owner, the applicant, and the person or firm preparing the site plan
Comments: YES NO
- 5. The existing topography with a maximum of two (2) foot contour intervals. Where existing ground is on a slope of less than two percent (2%), either one (1) foot contours or spot elevations where necessary but not more than fifty (50) feet apart in both directions, shall be indicated on site plan.
Comments: YES NO
- 6. Existing and proposed utility lines and easements in accordance with Iowa Statewide Urban Design and Specifications (SUDAS) and City of West Branch Subdivision Regulations.
Comments: YES NO
- 7. Structure Information:
 - a. Total number and type of dwelling units proposed YES NO
 - b. Proposed uses for all buildings YES NO
 - c. Total floor area of each building YES NO
 - d. Estimated number of employees for each proposed use where applicable YES NO
 - e. Any other information, including peak demand, which may be necessary to determine the number of off-street parking spaces and loading spaces. ~~YES NO~~
- 8. Location, shape, and all exterior elevation views of all proposed buildings, for the purpose of understanding the structures and building materials to be used, the location of windows, doors, overhangs, projection height, etc. and the grade relationship to floor elevation, and the number of stories of each existing building to be retained and of each proposed building. YES NO
- 9. Property lines and all required yard setbacks. YES NO
- 10. Location, grade and dimensions of all existing and proposed paved surfaces and all abutting streets. YES NO



- 11. Complete traffic circulation and parking plan, showing the location and dimensions of all existing and proposed parking stalls, loading areas, entrance and exit drives, sidewalks, dividers, planters, and other similar permanent improvements. YES NO
- 12. Location and type of existing or proposed signs and of any existing or proposed lighting on the property which illuminates any part of any required yard. YES NO
- 13. Location of existing trees six (6) inches or larger in diameter, landslide areas, springs and streams and other bodies of water, and any area subject to flooding by a one hundred (100) year storm on site and downstream off site. YES NO
- 14. Location, amount and type of any proposed landscaping. Location of proposed plantings, fences, walls, or other screening as required by the zoning regulations and the design standards set forth in Section 173.03. YES NO
- 15. A vicinity map at a scale of 1" = 500' or larger, showing the general location of the property, and the adjoining land uses and zoning. YES NO
- 16. Soil tests and similar information, if deemed necessary by the City Engineer, to determine the feasibility of the proposed development in relation to the design standards set forth in Section 173.03. ~~YES NO~~
- 17. Where possible ownership or boundary problems exist, as determined by the Zoning Administrator, a property survey by a licensed land surveyor may be required. ~~YES NO~~
- 18. Stormwater Pollution Prevention Plan. YES NO
- 19. Stormwater Management Plan. YES NO
- 20. Pre-Application Conference. YES NO
- 21. Provide 25% of open space
 - a. Said open space shall be unencumbered with any structure, or off-street parking or roadways and drives, and shall be landscaped and maintained with grass, trees and shrubbery. YES NO
 - b. Each principal structure of an apartment or office complex on same site shall be separated from any other principal structure in the complex by an open space of not less than sixteen (16) feet. ~~YES NO~~
- 22. Landscaping Requirements
 - a. Minimum requirements at the time of planting - Two (2) trees minimum or one (1) tree of the following size per 1,500 square feet of open space, whichever is greater: 40 Percent 1½" - 2" caliper diameter. Balance 1" - 1½" caliper diameter. (Evergreen trees shall not be less than three (3) feet in height.) YES NO
 - b. Minimum requirements at the time of planting - 6 shrubs, or 1 shrub per 1,000 square feet of open space, whichever is greater. YES NO



23. Buffer Required

a. Any other zoning district, other than an Agricultural A-1 District, that abuts any residential district shall require a buffer as described in this section. The buffer shall be provided by the non-residential use when adjoining a residential district.

YES NO

b. All Industrial Districts that abut any other district shall provide a buffer as required by this section.

YES NO

c. Any storage area, garbage storage, junk storage or loading docks, and loading areas, in any District shall be screened from public street view by a buffer

YES NO

24. Buffers

a. Buffer Wall: A buffer wall shall not be less than six (6) feet in height; constructed of a permanent low maintenance material such as concrete block, cinder block, brick, concrete, precast concrete or tile block; the permanent low-maintenance wall shall be designed by an architect or engineer for both structural adequacy and aesthetic quality.

YES NO

b. Landscape Buffer: A landscape buffer shall not be less than twenty-five (25) feet in width, designed and landscaped with earth berm and predominant plantings of evergreen type trees, shrubs and plants so as to assure year around effectiveness.

YES NO

25. Surfacing Requirements.

a. All off-street parking and loading areas and access roadways shall have a durable and dustless surface paved with asphaltic or Portland cement concrete pavement or pervious pavement. Off-street parking of automobiles, vans, campers, trucks, trailers, tractors, recreational vehicles, boats, construction equipment, and any other mobile vehicles shall be on an asphaltic or Portland cement concrete paved off-street parking area and not parked or stored within the landscaped open space area of the front yard. All off-street parking areas and associated driveways, access roadways and frontage roads, except driveways for single family residences, shall be constructed with permanent, integrally attached 6" high curbing or curbing of alternate height.

YES NO

b. Portland Cement Concrete shall have a minimum thickness of five (5) inches.

YES NO

c. Asphaltic Cement Concrete shall have a minimum thickness of six (6) inches.

YES NO

d. Material utilized in the subgrade shall be well drained and not susceptible to frost boils. Driveways for attached townhouse style residences shall be Portland cement concrete or asphaltic concrete with minimum thickness of five (5) inches and six (6) inches, with well-drained subgrade base and not greater than eighteen (18) feet in width.

YES NO

26. Landscaping, Screening and Open Space Requirements.

- a. All parking areas be aesthetically improved to reduce obtrusive characteristics that are inherent to their use. YES NO
- b. Parking areas shall be effectively screened from general public view and contain shade trees within parking islands where multiple aisles of parking exist. Not less than five (5) percent of the interior parking area shall be landscaped within parking islands. ~~YES NO~~

27. Off-Street Parking Access to Public Streets and Internal Traffic Circulation.

- a. forward movement of the vehicle. YES NO
- b. Driveway approach returns shall not extend beyond the side lot line as extended. YES NO
- c. The number of ingress/egress access points to public streets from offstreet parking areas located to limit vehicular conflicts, preserve proper traffic safety. YES NO

28. Handicap Accessible Parking Requirements - comply with the parking space minimum requirements.

YES NO

29. Traffic Analysis Requirements. Any project which contains 100 dwelling units or 1,000 average day trips.

~~YES NO~~

30. Architectural Standards - architectural plans for buildings shall be submitted for review and approval.

YES NO

2017

PRELIMINARY

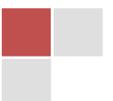
Croell Redi-Mix

STORMWATER MANAGEMENT PLAN
145 Fawcett Drive
West Branch, Iowa



Prepared By:

Snyder & Associates
5005 Bowling St. SW
Cedar Rapids, IA 52404
Telephone: (319) 362-9394



PRELIMINARY

TABLE OF CONTENTS

1. Hydrologic Summary
2. General Information
3. Design Parameters
4. Existing Conditions
5. Proposed Conditions
6. Conclusions and Recommendations

APPENDIX

- A. Site Plan
- B. Detention Calculations

PRELIMINARY

1. Hydrologic Summary

This design was completed using the SCS Unit Hydrograph Method. Data was entered into the Bentley's Pondpack v. 08.11.01.56 program. A brief summary of the results are shown in the information below and additional details are provided throughout the report.

Modeled Drainage Area = 4.85 Acres

Pre-Developed Peak Flows

Pre-Developed 5-Year Peak Flow = 7.06 cfs

Post Developed Peak Flows w/Detention Facilities

Basin Volume = 1.5 acre-ft

Bottom Elevation = 736.00 ft

Top Water Elevation = 739.20 ft

Freeboard Elevation = 740.50 ft

100 Year Design Storm Routing:

Peak Outflow = 5.02 cfs

100-Yr Post-Developed Outflow < 5-Yr Pre-Developed Flow
5.02 cfs < 7.06 cfs

2. General Information

This stormwater management study was developed to analyze the pre and post-developed conditions for a proposed Concrete Plant for Croell Redi-Mix located in West Branch, Iowa. The described site includes 8 acres of development analyzed for the study.

The subject property is Lot A of Lot 4 in the Rummell's Commercial Subdivision. More specifically the development is located at 145 Fawcett Drive.

The purpose of this study is to evaluate the impact to the rate of stormwater runoff by developing the subject property. The existing and proposed conditions of the watershed were assessed and recommendations made regarding the necessary storm water detention and outfall improvements.

PRELIMINARY

3. *Design Parameters*

Multiple design standards were referenced for specific computational methods and parameters necessary for the calculation of the detention area.

The Natural Resources Conservation Service (NRCS) soils map indicated that the soil in this region falls under hydrologic soils group C. Coefficients from the hydrologic soil group C were used to design the storm drainage.

The Iowa Rainfall Intensity Chart was used to determine rainfall for Section 6. These estimates determined updated rainfall intensities for storm events specifically in the area of interest.

Hydrographs were created for both the pre-developed and post-developed conditions. These hydrographs were developed using the SCS Unity Hydrograph Method utilizing Bentley Pond Pack software. This software creates and routes the hydrograph for each condition through the watershed network by use of reaches.

Statewide Urban Design and Specifications (SUDAS) was referenced while designing for the detention area and water quality constraints.

4. *Existing Conditions*

The new improvements for the Croell Redi-Mix will develop approximately 4.85 acres of the 8 acres for the entire site. In its existing state, the property is a contoured field on a hillside. Based on these considerations, a Runoff Coefficient of 0.71 was used for the property. The pre-developed time of concentration was determined to be 15 minutes for the water to reach the west end of the property from the far eastern property line. There were no other sources of water runoff that were included in the calculations.

Refer to the appendix included with this report for the pre-developed network summary and calculations.

5. Proposed Conditions

The post-developed conditions for this project include a concrete plant and all associated driveways, parking lots, out buildings, cleaning facilities, and detention basin. Upon completion of the project, approximately 4.85 acres of the drainage area will be directed through the detention basin. A Runoff Coefficient of 0.81 and time of concentration of 5 minutes was applied to the post-developed state since most of the disturbed area will be paved with concrete with the eastern half of the drainage area remaining as grass. Green space will be provided along the front and sides of the property.

One detention basin is proposed on the site to collect the storm water runoff and release it in a controlled manner. The 4.85 developable acres of the property were taken into consideration when designing this detention pond to ensure adequate storage. An outlet pipe will be used in the detention basin to ensure the 100 year post-developed flows remain below the 5 year pre-developed. The outlet structure will direct flow to the unnamed streambed. Refer to the attached site plan for the proposed storm water detention system.

Refer to the Hydrologic Summary at the beginning of this report and/or the Pond Pack output information in the Appendix for detailed flow information.

6. Conclusion and Recommendations

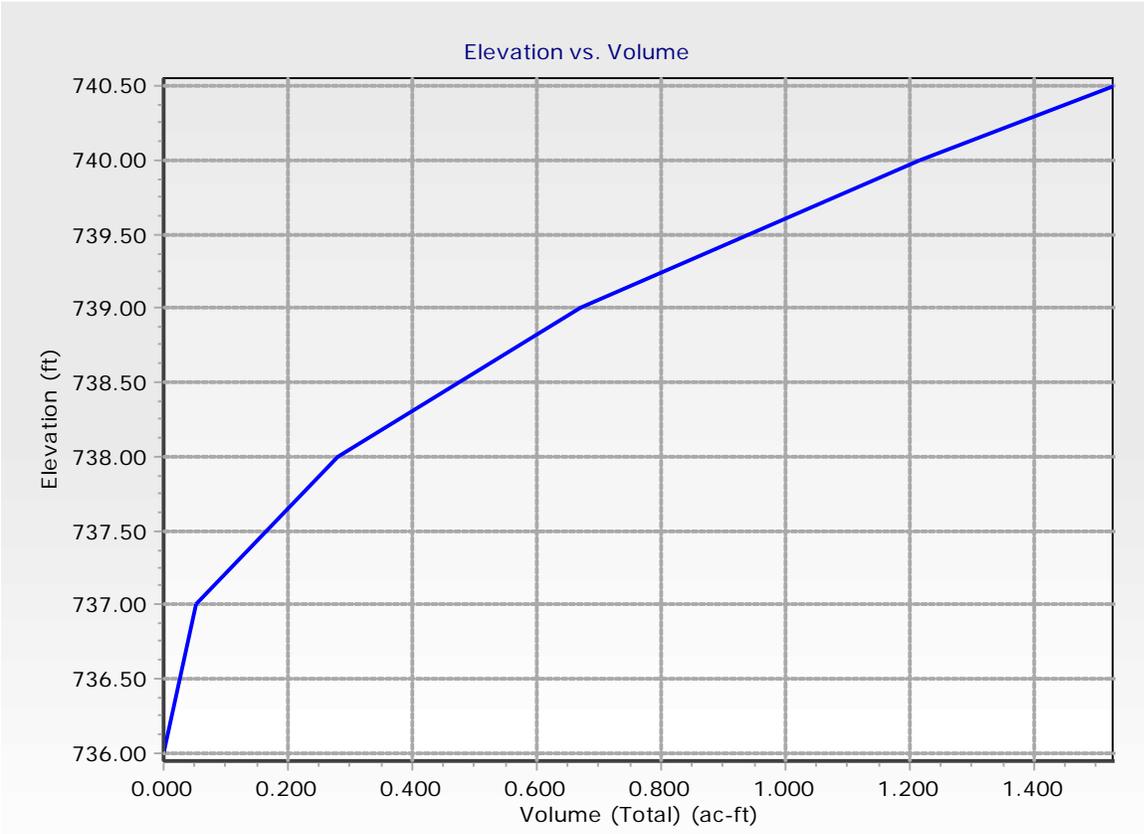
The development of the Croell Redi-Mix site will not adversely impact downstream properties or facilities, as the 100 year post-developed peak flow rates will be controlled and maintained below the 5 year flow rates in the existing conditions. The site will be graded to direct the runoff into the detention basin and the runoff will be released from the basin in a controlled manner.

PondMaker Worksheet Detailed Report: Worksheet (PO-1) - 1

Element Details			
ID	39		
Label	Worksheet (PO-1) - 1		
Select Pond to Design	PO-1		
Flow Allowed Below Target	100.0		
Flow Allowed Above Target	0.0		
Flow Allowed Below Target	100.0		
Flow Allowed Above Target	0.0		
Volume Allowed Below Target	100.0		
Volume Allowed Above Target	50.0		
Tolerance Display	Display PASS for values within specified tolerance		
Notes			
Volume			
Pond Type	Elevation-Area	Use Void Space?	False
Elevation-Area			
Pond Elevation (ft)	Pond Area (acres)		
736.00	0.000		
737.00	0.160		
738.00	0.300		
739.00	0.490		
740.00	0.600		
740.50	0.660		
Infiltration			
Infiltration Method	No Infiltration		
Output			
Detention Time	None		
Initial Conditions			
Is Outflow Averaging On?	False	Define Starting Water Surface Elevation	Pond Invert

PRELIMINARY

PondMaker Worksheet Detailed Report: Worksheet (PO-1) - 1

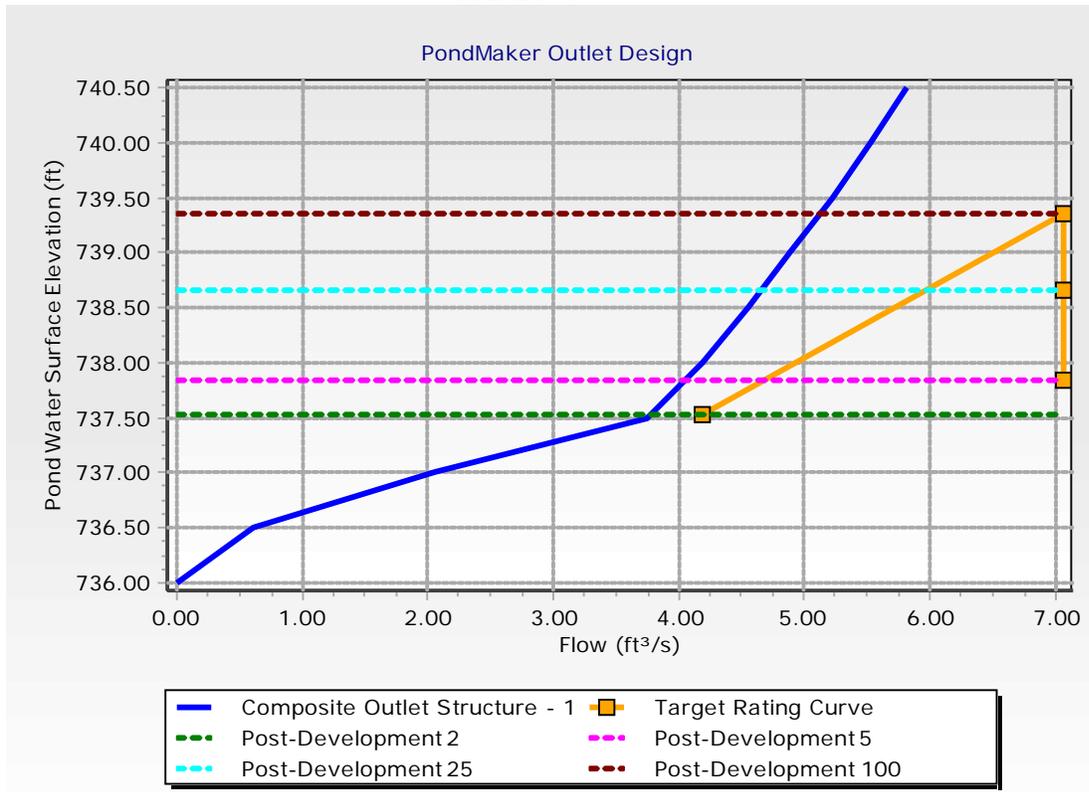


PRELIMINARY

PondMaker Worksheet Detailed Report: Worksheet (PO-1) - 1

PondMaker Worksheet (Outlet Design)

Design Scenario			Design Return Event	Target Peak Outflow (ft ³ /s)	Target Outflow Volume (ac-ft)	Peak Pond Inflow (ft ³ /s)	Total Inflow Volume (ac-ft)
Post-Development 2			2	4.19	0.308	9.65	0.533
Post-Development 5			5	7.06	0.493	13.95	0.772
Post-Development 25			25	7.06	0.493	24.76	1.363
Post-Development 100			100	7.06	0.493	36.46	2.023
Estimated Storage (ac-ft)	Estimated Max Water Surface Elevation (ft)	Estimated Freeboard Depth	Design Outlet Structure	Estimated Peak Outflow (ft ³ /s)	Estimated Peak Outflow vs. Target		
0.173	737.53	Pass	Composite Outlet Structure - 1	3.76	Pass		
0.244	737.84	Pass	Composite Outlet Structure - 1	4.05	Pass		
0.538	738.66	Pass	Composite Outlet Structure - 1	4.66	Pass		
0.864	739.35	Pass	Composite Outlet Structure - 1	5.12	Pass		



PRELIMINARY

PondMaker Worksheet Detailed Report: Worksheet (PO-1) - 1

PondMaker Worksheet (Routing Design)

Design Scenario	Design Return Event	Target Peak Outflow (ft ³ /s)	Computed Peak Outflow (ft ³ /s)	Computed Peak Outflow vs. Target	Target Outflow Volume (ac-ft)
Post-Development 2	2	4.19	3.65	Pass	0.308
Post-Development 5	5	7.06	4.03	Pass	0.493
Post-Development 25	25	7.06	4.59	Pass	0.493
Post-Development 100	100	7.06	5.02	Pass	0.493

Computed Volume Outflow (ac-ft)	Computed Outflow Volume vs. Target	Routing Outlet Structure	Computed Max Water Elevation (ft)	Freeboard Depth	Maximum Storage (ac-ft)
0.532	Fail	Composite Outlet Structure - 1	737.47	Pass	0.143
0.770	Fail	Composite Outlet Structure - 1	737.82	Pass	0.228
1.360	Fail	Composite Outlet Structure - 1	738.56	Pass	0.477
2.019	Fail	Composite Outlet Structure - 1	739.20	Pass	0.773

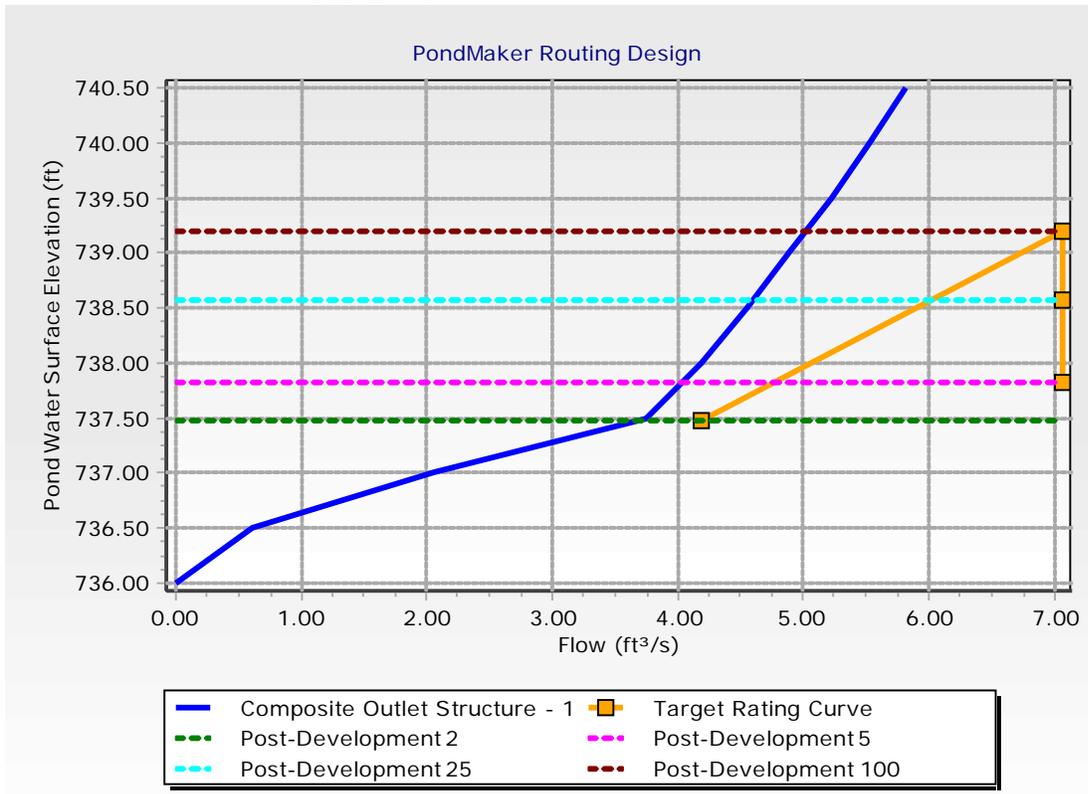


Table 2B-4.01: Runoff Coefficients for the Rational Method

Cover Type and Hydrologic Condition <i>Recurrence Interval</i>	Runoff Coefficients for Hydrologic Soil Group											
	A			B			C			D		
	5	10	100	5	10	100	5	10	100	5	10	100
Open Space (lawns, parks, golf courses, cemeteries, etc.)												
Poor condition (grass cover < 50%)	.25	.30	.50	.45	.55	.65	.65	.70	.80	.70	.75	.85
Fair condition (grass cover 50% to 75%)	.10	.10	.15	.25	.30	.50	.45	.55	.65	.60	.65	.75
Good condition (grass cover >75%)	.05	.05	.10	.15	.20	.35	.35	.40	.55	.50	.55	.65
Impervious Areas												
Parking lots, roofs, driveways, etc. (excluding ROW)	.95	.95	.98	.95	.95	.98	.95	.95	.98	.95	.95	.98
Streets and roads:												
Paved; curbs & storm sewers (excluding ROW)	.95	.95	.98	.95	.95	.98	.95	.95	.98	.95	.95	.98
Paved; open ditches (including ROW)	---	---	---	.70	.75	.85	.80	.85	.90	.80	.85	.90
Gravel (including ROW)	---	---	---	.60	.65	.75	.70	.75	.85	.75	.80	.85
Dirt (including ROW)	---	---	---	.55	.60	.70	.65	.70	.80	.70	.75	.85
Urban Districts (excluding ROW)												
Commercial and business (85% impervious)	---	---	---	---	---	---	.85	.85	.90	.90	.90	.95
Industrial (72% impervious)	---	---	---	---	---	---	.80	.80	.85	.80	.85	.90
Residential Districts by Average Lot Size (excluding ROW)¹												
1/8 acre (36% impervious)	---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/4 acre (36% impervious)	---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/3 acre (33% impervious)	---	---	---	---	---	---	.55	.60	.70	.65	.70	.75
1/2 acre (20% impervious)	---	---	---	---	---	---	.45	.50	.65	.60	.65	.70
1 acre (11% impervious)	---	---	---	---	---	---	.40	.45	.60	.55	.60	.65
2 acres (11% impervious)	---	---	---	---	---	---	.40	.45	.60	.55	.60	.65
Newly Graded Areas (pervious areas only, no vegetation)												
Agricultural and Undeveloped												
Meadow - protected from grazing (pre-settlement)10	.10	.25	.10	.15	.30	.30	.35	.55	.45	.50	.65
Straight Row Crops												
Straight Row (SR)	<i>Poor Condition</i>	.33	.39	.55	.52	.58	.71	.70	.74	.84	.78	.89
	<i>Good Condition</i>	.24	.30	.46	.45	.51	.66	.62	.67	.78	.73	.86
SR + Crop Residue (CR)	<i>Poor Condition</i>	.31	.37	.54	.50	.56	.70	.67	.72	.82	.75	.87
	<i>Good Condition</i>	.19	.25	.41	.38	.45	.61	.55	.60	.73	.62	.78
Contoured (C)	<i>Poor Condition</i>	.29	.35	.52	.47	.53	.70	.60	.65	.77	.70	.84
	<i>Good Condition</i>	.21	.26	.43	.38	.45	.61	.55	.60	.73	.65	.80
C+CR	<i>Poor Condition</i>	.27	.33	.50	.45	.51	.66	.57	.63	.75	.67	.82
	<i>Good Condition</i>	.19	.25	.41	.36	.43	.59	.52	.58	.71	.62	.78
Contoured & Terraced (C&T)	<i>Poor Condition</i>	.22	.28	.45	.36	.43	.59	.50	.56	.70	.55	.73
	<i>Good Condition</i>	.16	.22	.38	.31	.37	.54	.45	.51	.66	.52	.71
C&T + CR	<i>Poor Condition</i>	.13	.19	.35	.31	.37	.54	.45	.51	.66	.52	.71
	<i>Good Condition</i>	.10	.16	.32	.27	.33	.50	.43	.49	.65	.50	.70

¹ The average percent impervious area shown was used to develop composite coefficients.

Note: Rational coefficients were derived from SCS CN method

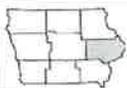
- b. Composite Runoff Analysis:** Care should be taken not to average runoff coefficients for large segments that have multiple land uses of a wide variety (i.e., business to agriculture). However, within similar land uses, it is often desirable to develop a composite runoff coefficient based on the percentage of different types of surface in the drainage area. The composite procedure can be applied to an entire drainage area, or to typical sample blocks as a guide to selection of reasonable values of the coefficient for an entire area.

Table 2B-2.06: Section 5 - Central Iowa
Rainfall Depth and Intensity for Various Return Periods

	Return Period															
	1 year		2 year		5 year		10 year		25 year		50 year		100 year		500 year	
	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I
5 min	0.39	4.78	0.46	5.59	0.57	6.91	0.67	8.1	0.81	9.76	0.92	11.1	1.04	12.4	1.33	15.9
10 min	0.58	3.51	0.68	4.08	0.84	5.08	0.98	5.92	1.19	7.16	1.35	8.13	1.52	9.15	1.94	11.6
15 min	0.71	2.84	0.83	3.32	1.03	4.12	1.20	4.82	1.45	5.81	1.65	6.61	1.86	7.44	2.37	9.50
30 min	0.99	1.99	1.16	2.33	1.45	2.91	1.70	3.40	2.05	4.11	2.34	4.68	2.63	5.27	3.36	6.73
1 hr	1.29	1.29	1.51	1.51	1.89	1.89	2.23	2.23	2.72	2.72	3.13	3.13	3.55	3.55	4.62	4.62
2 hr	1.58	0.79	1.85	0.92	2.33	1.16	2.76	1.38	3.39	1.69	3.91	1.95	4.46	2.23	5.88	2.94
3 hr	1.75	0.58	2.06	0.68	2.60	0.86	3.09	1.03	3.82	1.27	4.42	1.47	5.07	1.69	6.76	2.25
6 hr	2.05	0.34	2.40	0.40	3.03	0.50	3.61	0.60	4.47	0.74	5.20	0.86	5.98	0.99	8.02	1.33
12 hr	2.34	0.19	2.74	0.22	3.44	0.28	4.07	0.33	5.01	0.41	5.79	0.48	6.62	0.55	8.79	0.73
24 hr	2.67	0.11	3.08	0.12	3.81	0.15	4.46	0.18	5.44	0.22	6.26	0.26	7.12	0.29	9.37	0.39
48 hr	3.06	0.06	3.49	0.07	4.25	0.08	4.94	0.10	5.96	0.12	6.81	0.14	7.71	0.16	10.0	0.20
3 day	3.34	0.04	3.81	0.05	4.63	0.06	5.36	0.07	6.43	0.08	7.31	0.10	8.25	0.11	10.6	0.14
4 day	3.59	0.03	4.09	0.04	4.96	0.05	5.74	0.05	6.86	0.07	7.78	0.08	8.74	0.09	11.1	0.11
7 day	4.25	0.02	4.83	0.02	5.82	0.03	6.69	0.03	7.93	0.04	8.93	0.05	9.98	0.05	12.5	0.07
10 day	4.87	0.02	5.50	0.02	6.58	0.02	7.52	0.03	8.86	0.03	9.94	0.04	11.0	0.04	13.8	0.05

D = Total depth of rainfall for given storm duration (inches)
 I = Rainfall intensity for given storm duration (inches/hour)

Table 2B-2.07: Section 6 - East Central Iowa
Rainfall Depth and Intensity for Various Return Periods

	Return Period															
	1 year		2 year		5 year		10 year		25 year		50 year		100 year		500 year	
	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I
5 min	0.38	4.56	0.44	5.30	0.54	6.56	0.63	7.65	0.76	9.18	0.86	10.3	0.97	11.6	1.23	14.8
10 min	0.55	3.33	0.64	3.87	0.8	4.8	0.93	5.58	1.11	6.70	1.26	7.60	1.42	8.54	1.80	10.8
15 min	0.67	2.70	0.78	3.14	0.97	3.88	1.13	4.53	1.36	5.45	1.54	6.18	1.73	6.94	2.20	8.81
30 min	0.95	1.90	1.11	2.22	1.38	2.76	1.61	3.22	1.94	3.88	2.20	4.40	2.47	4.95	3.14	6.29
1 hr	1.23	1.23	1.44	1.44	1.80	1.80	2.11	2.11	2.58	2.58	2.96	2.96	3.36	3.36	4.37	4.37
2 hr	1.51	0.75	1.77	0.88	2.22	1.11	2.62	1.31	3.22	1.61	3.71	1.85	4.24	2.12	5.60	2.80
3 hr	1.68	0.56	1.96	0.65	2.47	0.82	2.93	0.97	3.63	1.21	4.22	1.40	4.85	1.61	6.50	2.16
6 hr	1.97	0.32	2.30	0.38	2.89	0.48	3.45	0.57	4.3	0.71	5.02	0.83	5.8	0.96	7.87	1.31
12 hr	2.28	0.19	2.65	0.22	3.31	0.27	3.93	0.32	4.88	0.40	5.68	0.47	6.56	0.54	8.87	0.73
24 hr	2.60	0.10	3.01	0.12	3.75	0.15	4.42	0.18	5.44	0.22	6.29	0.26	7.22	0.30	9.64	0.40
48 hr	2.98	0.06	3.43	0.07	4.22	0.08	4.93	0.10	6.01	0.12	6.90	0.14	7.86	0.16	10.3	0.21
3 day	3.28	0.04	3.72	0.05	4.51	0.06	5.24	0.07	6.32	0.08	7.22	0.10	8.19	0.11	10.7	0.14
4 day	3.53	0.03	3.98	0.04	4.78	0.04	5.50	0.05	6.58	0.06	7.49	0.07	8.46	0.08	10.9	0.11
7 day	4.17	0.02	4.67	0.02	5.53	0.03	6.29	0.03	7.39	0.04	8.30	0.04	9.25	0.05	11.6	0.06
10 day	4.75	0.01	5.30	0.02	6.24	0.02	7.04	0.02	8.20	0.03	9.12	0.03	10.0	0.04	12.4	0.05

D = Total depth of rainfall for given storm duration (inches)
 I = Rainfall intensity for given storm duration (inches/hour)

Worksheet 2B-3.01: Time of Concentration (T_c) or Travel Time (T_t)

Project Croell Site Plan By LC Date 10/21/16
 Location West Branch Checked _____ Date _____

Circle one: Present Developed

Circle one: T_c T_t through subarea

Notes: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

1. Surface description (Table 2B-3.01).....
2. Manning's roughness coeff., n (Table 2B-3.01).....
3. Flow Length, L (Total L less than or equal to 300')...
4. Two year, 24 hour rainfall, P₂.....
5. Land slope, s.....
6. $T_t = \frac{0.007 (nL)^{0.8}}{(\sqrt{P_2}) s^{0.4}}$ Compute T_t.....

Segment ID	1				
	Cultivated Soil >20%				
	0.17				
	100	ft			
	3.01	in			
	0.04	ft / ft			
	0.14	hr	+		= 0.14

Shallow concentrated flow

7. Surface description (paved or unpaved).....
8. Flow length, L.....
9. Watercourse slope, s.....
10. Average velocity, V (Figure 2B-3.01).....
11. $T_t = \frac{L}{3600 V}$ Compute T_t.....

Segment ID	2				
	unpaved				
	430	ft			
	0.053	ft / ft			
	1.25	ft / s			
	0.10	hr	+		= 0.10

Open channel / pipe flow

12. Cross sectional flow area, a.....
13. Wetted perimeter, P_w.....
14. Hydraulic radius, $r = \frac{a}{P_w}$ Compute r.....
15. Channel slope, s.....
16. Manning's roughness coeff., n.....
17. $V = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V.....
18. Flow length, L.....
19. $T_t = \frac{L}{3600 V}$ Compute T_t.....
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11 and 19).....

Segment ID					
		ft ²			
		ft			
		ft			
		ft / ft			
		ft / s			
		ft			
		hr	+		=
					0.24