

September 25, 2012

Curt Moore
Teton County Planning
150 Courthouse Drive
Driggs, Idaho 83422

RE: Blue Indian Phase 2 Engineering Review Comments

Dear Mr. Moore:

This letter includes response to comments included in a memo dated September 10, 2012 from Williams Engineering, Inc. (WEI) which was forwarded to us via email on September 19, 2012. The memo includes engineering review comments pertaining to the Blue Indian Subdivision Phase 2 Plat dated February 22 and March 2, 2012; plans dated June 29, 2012; Masterplan dated December 1, 2009 and the Phase 1 Drainage Report dated November 11, 2009.

The majority of the comments refer to the Phase 1 Drainage Report which was approved with the Phase 1 final plat and Master Plan by the Teton County Board of County Commissioners on November 12, 2009. The WEI review did not include the Phase 2 Drainage Report dated June 21, 2012 and some of the review comments are addressed in this later report as stated below. The Phase 2 report was sent via email to WEI on September 19, 2012.

DR-1 Offsite Considerations – Discussion of offsite drainage is included in the Phase 2 report, page 7 and Appendix A page 14-16 and Appendix B page 3, 50-54.

DR-2 Thundershower Runoff – The NRCS Curve Number method was developed from 20 years of studies of the rainfall-runoff relationship for small rural watersheds. It is a recommended method for estimating direct runoff in guidelines published by the Idaho Transportation Department “Drainage Design Manual” (Section 620.00), the “Catalog of Stormwater Best Management Practices for Idaho Cities and Counties” (Appendix D) and is commonly used by jurisdictions throughout the west including Teton County Wyoming (Teton County Wyoming LDR Section 4920 B.1). This method and the associated CNs that were used in the Phase 1 and Phase 2 Drainage Reports are taken from tables published by the NRCS (1986) and I am not comfortable arbitrarily increasing the CNs based on an opinion that is not a “national standard” with no supporting data.

DR-3 Rainfall on snowmelt on frozen ground runoffs – The extent of the requirements for drainage design from Teton County Code, 9-4-2-B-6 is as follows:

Drainage: Each subdivision and PUD shall provide a storm water drainage system, together with a stamped certification from a professional engineer that the proposed storm water drainage is adequate to retain or detain anticipated peak storm water on site and/or convey it off-site in compliance with state and local law requirements regarding the protection of downstream property owners, and in a manner to prevent soil erosion and sedimentation both on and off-site. (amd. 11-14-08)

And from the “Highway and Street Guidelines for Design and Construction” published November, 2001 and adopted by the Teton County Idaho BOCC April 25, 2005,

The [drainage] design shall be based on the Idaho Transportation Department’s publication, Urban Storm Sewer Design for Idaho Highways, latest edition, or procedures as set forth by the LHH. The design storm return period shall be at least ten (10) years.

The stormwater management system for Blue Indian was designed to enhance water quality from nuisance flows (first 1” of runoff or the 2-year event), convey runoff from minor storm events (10-year recurrence interval) via swales and culverts, and convey runoff from major storm events (100-year recurrence interval) without causing more than 1-ft of flow depth over the roads to allow for emergency vehicle access. The developed peak and volume of runoff from the 100 year event is less than historic conditions. This is above and beyond the current Teton County drainage design requirements and is consistent with requirements in other jurisdictions.

However, we did investigate the rainfall on snowmelt and frozen ground conditions in order to assure that the current design is adequate in this condition as well. Guidelines from the “Catalog of Stormwater Best Management Practices for Idaho Cities and Counties” were used. Curve Numbers were adjusted to reflect an antecedent moisture condition of III and the depth of precipitation was increased to account for snowmelt using the Degree-Day Method. These adjustments account for a conservative condition of the highest intensity storm occurring during a sudden thaw of 40 degrees. Infiltration from the ponds was excluded from the outflow and road overtopping was added using a broad crested weir model. The input and output is summarized in the following tables.

Table 1 – Runoff Curve Numbers

Description of Land Use	CN (Hydrologic Soil Group B, AMC II)	CN (AMC III)
Meadow (grass, no grazing, mowed for hay)	58	76
Gravel Roads	85	94
Paved parking lots, roofs, driveways	98	99

Table 2 – Design Storm Data

Recurrence Interval	Storm Type	24-hr Precipitation	24-hr Precipitation w/ snowmelt
100-yr	Type II	2.53 inches	3.09 inches
10-yr	Type II	1.6 inches	2.16 inches

Table 3 – Drainage Summary Table Historic

HISTORIC CONDITIONS				
Design Pnt	Trib. Basin(s)	Trib. Area (ac)	Peak Q ₁₀₀ (cfs)	V ₁₀₀ (ac-ft)
DP1	Ex 1	88.9	39.2	8.0
DP2	Ex 2	27.5	13.4	2.5
DP3	Ex 3	10.5	6.2	0.9
DP4	EX 4	15.7	9.3	1.4

Table 4 – Drainage Summary Table, Proposed

HISTORIC CONDITIONS					
Design Pnt	Trib Basin(s)	Trib Area (ac)	Retention Pond(s)	Peak Q ₁₀₀ (cfs)	V ₁₀₀ (ac-ft)
DP1	Pr 3, Pr 5, Pr 6, Pr1, Pr2, Pr10, Pr7	87.7	7, 5, 1, 2, 3	38.7	8.2
DP2	Pr 4, Pr11	27.1	4	11.9	2.3
DP3	Pr 13, Pr14, Pr12, OS1	7.8	8	3.5	0.4
DP4	Pr 8	16.9	6	10.6	1.6

DR-4 Conveyance Capacities - A single culvert is proposed with Phase 2 and the hydraulic analysis is included in the Phase 2 report (Appendix A p. 52-54). This culvert operates under outlet control up to 4 cfs and inlet control at flow rates greater than 4 cfs. The 100-year peak flow of 22 cfs overtops the road with a depth of less than 6 inches.

DR-5 Phase I – The Phase 2 report includes a complete analysis of both Phase 1 and Phase 2 facilities and shows that Phase 1 facilities are not overloaded and offsite flow is not increased in rate or volume from historic conditions.

C-300-1 Culvert Profile – Invert elevations and length for the culvert as well as ROW lines and easement lines are shown on the roadway plan. Cover over the culvert is shown on the road profile. The typical roadside swale is modified in the vicinity of the culvert inlet and outlet as shown by the contours in the plan view. The culvert rating curve is included in the Phase 2 report (Appendix A)

C-300-2 Pond – See response to DR-3

C-301-1 Pond – See response to DR-3

C-302-1 Concentrated Flow to Offsite – Under historic conditions the tributary area draining to the north is 0.96 acres. The proposed tributary area is 0.68 acres.

C-302-2 Overflow onto Lots

C-302-3 Ponded Water

C302-4 Pond

C304-1 Pond

C-500-1 Infiltration Basin Detail

C-500-2 Road Section – The road section shown is the Teton County standard road section (See page 12 of the Highway and Street Guidelines for Design and Construction adopted by Teton County) and was approved with Phase 1 plans. Using roadway design parameters included in the geotechnical report by Womack & Associates, Inc. dated December 17, 2007, the proposed county road section results in a $SN=1.83$ and is adequate. ($SN=a_1D_1 + a_2D_2$, where $a_1=0.14$; $a_2=0.10$; D_1 =depth of base course; D_2 =depth of subbase)

C-501-1 Fire Hydrant Supply Line – The net positive suction head available ($NPSH_a$) was calculated as follows:

$$NPSH_a = h_a - h_{vp} - h_s - h_f$$

where

h_a = absolute pressure / barometric pressure = 30.07 inches Hg = 34.8 ft (from National Climatic Data Center data from 1988 to 2011 for station located at REXBURG-MADISON COUNTY APT (KRXE))

h_{vp} = vapor pressure = 1.2 ft (based on temperature of 80°F which is the average maximum monthly temperature for July and August per Western Regional Climate Center from 8/1/1904 to 8/31/2012)

h_s = static head = 13 ft (height difference from intake to pump on truck)

h_f = friction losses = 5.1 ft (see enclosed calculations)

$$NPSH_a = 15.5 \text{ ft} = 36 \text{ psi} > 20 \text{ psi required, therefore o.k.}$$

Please let me know if you have any questions or need additional information.

Sincerely,

Jennifer Zung, PE
Harmony Design & Engineering

Enclosure



STUDIES - MASTERPLANS - DESIGNS - CONSTRUCTION SERVICES - REVIEWS

WILLIAMS ENGINEERING, INC.

Serving the Rocky Mountain Region Since 1992

Engineering Review Comments

On the

BLUE INDIAN SUBDIVISION

WEL Review Comments **(By Gerald R. Williams, P.E.)**

Original review comments below in black text are dated September 27, 2012, and pertain to the plat dated February 22 and March 2, 2012, plans dated June 29, 2012, Masterplan dated December 1, 2009, and the Drainage Report dated November 11, 2009.

- C-500-2 Road Section** The roads need to provide an all weather surface for fire trucks and other service vehicles. Please provide the Geotechnical Report or calculations that show structural adequacy of the road section for HS-20 loading, or note that County standards are being followed.
- C-501-1 Fire Hydrant Supply Line** Show, using barometric pressure (atmospheric minus potential barometric drop) minus the vapor pressure, that there will be sufficient pressure at the hydrant nozzle elevation to meet the fire district's pressure needed to push the required fire district flow rate through their suction hose to their truck. That is, if they need X psi at the nozzle to get Y flow through their suction line to the truck, will the 8" line shown provide sufficient capacity given barometric pressures and elevation differences? Assume the pond water level is at the bottom of the storage fire flow storage volume.

October 1, 2012

Curt Moore
Teton County Planning
150 Courthouse Drive
Driggs, Idaho 83422



RE: Blue Indian Phase 2 Engineering Review Comments

Dear Mr. Moore:

This letter includes responses to engineering review comments for Blue Indian Phase 2 included in a memo dated September 27, 2012 from Williams Engineering, Inc. which was forwarded to us via email on September 27, 2012.

C-500-2 Road Section – The road section shown is the Teton County standard road section (See page 12 of the “Highway and Street Guidelines for Design and Construction” adopted by Teton County in 2005) and was approved with Phase 1 plans. Additionally, using roadway design parameters included in the geotechnical report by Womack & Associates, Inc. dated December 17, 2007, the proposed county road section results in a $SN=1.83$ and is adequate. ($SN=a_1D_1 + a_2D_2$, where $a_1=0.14$; $a_2=0.10$; D_1 =depth of base course; D_2 =depth of subbase)

C-501-1 Fire Hydrant Supply Line – The net positive suction head available ($NPSH_a$) was calculated as follows:

$$NPSH_a = h_a - h_{vp} - h_s - h_f$$

where

h_a = absolute pressure / barometric pressure = 30.07 inches Hg = 34.8 ft (average barometric pressure from National Climatic Data Center data between 1988 to 2011 for station located at REXBURG-MADISON COUNTY APT (KRXE))

h_{vp} = vapor pressure = 1.2 ft (based on temperature of 80°F which is the average maximum monthly temperature for July and August per Western Regional Climate Center from 8/ 1/1904 to 8/31/2012)

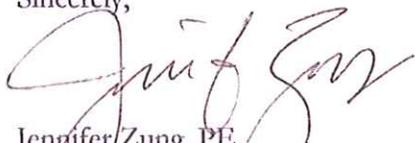
h_s = static head = 13 ft (height difference from intake to pump on truck)

h_f = friction losses = 5.1 ft (see enclosed calculations)

$$NPSH_a = 15.5 \text{ ft} = 36 \text{ psi} > 20 \text{ psi required, therefore ok}$$

Please let me know if you have any questions or need additional information.

Sincerely,



Jennifer Zung, PE
Harmony Design & Engineering

Enclosure

DRY HYDRANT DESIGN

Landowner Blue Indian Subdivision - Phase 2 Field No. n/a

Designed by Harmony Design & Eng Date 10/01/2012 Checked by JZ

1. Check with the local fire department for the desired design capacity. Design for 1000 gpm
2. Determine the SHL (static head loss) between the centerline of the intake strainer to the centerline of the intake on the pumper. Consult with the local fire department on the height of the pumper intake. SHL = 13 feet
3. Choose a pipeline diameter (8 inches) and determine the ISL (intake strainer loss) from Table A, below. ISL = 0.4 feet

Table A – Intake Strainer Loss (ISL) Based on Flow Rate and Pipeline Diameter

Pipeline Diameter (inches)	Flow Rate					
	500 gpm	750 gpm	1000 gpm	1250 gpm	1500 gpm	2000 gpm
6	0.4	0.8	1.4	2.2	3.2	5.6
8	0.1	0.3	0.4	0.7	1.0	1.8
10	0.1	0.1	0.2	0.3	0.4	0.7
12	0.1	0.1	0.2	0.3	0.3	0.4

4. Determine the total PHL (pipe head loss) for the pipeline and standpipe. Calculate PHL 1 for the pipeline by multiplying f_1 (friction head loss for the pipeline) by the pipeline length. Calculate PHL 2 for the standpipe by multiplying f_2 (friction head loss for the standpipe) by the standpipe equivalent length. Use Table B to determine f_1 and f_2 .

Table B – Friction Head Loss (f) Based on Flow Rate and Pipe Diameter

Pipe Diameter (inches)	Flow Rate					
	500 gpm	750 gpm	1000 gpm	1250 gpm	1500 gpm	2000 gpm
6	0.016	0.033	0.057	0.086	0.120	0.204
8	0.004	0.008	0.014	0.021	0.030	0.050
10	0.001	0.003	0.005	0.007	0.010	0.017
12	0.001	0.001	0.002	0.003	0.004	0.007

<i>a. Calculate PHL 1 for the Pipeline:</i>	
f_1 for the <u>8</u> -inch diameter pipeline = <u>0.014</u> feet/foot	PHL 1 = $f_1 \times$ pipeline length
Pipeline length = <u>150</u> feet	PHL 1 = <u>0.014</u> x <u>150</u> = <u>2.1</u> feet
<i>b. Calculate PHL 2 for the Standpipe:</i>	
Six-inch standpipe length = <u>5</u> feet	f_2 for the 6-in. diam. standpipe = <u>0.057</u> feet/foot
90-degree elbows <u>1</u> @ 20 feet each = <u>20</u> feet	
30/45-degree elbows _____ @ 10 feet each = <u>0</u> feet	
Reducers <u>1</u> @ 10 feet each = <u>10</u> feet	
In-line strainers _____ @ 10 feet each = <u>0</u> feet	
Pumper connection = <u>10</u> feet	PHL 2 = $f_2 \times$ standpipe equivalent length
Standpipe equivalent length (total of above) = <u>45</u> feet	PHL 2 = <u>0.057</u> x <u>45</u> = <u>2.6</u> feet
<i>c. Calculate the total PHL:</i>	
	PHL = PHL 1 + PHL 2 = <u>4.7</u> feet

5. Determine the THL (total head loss) = SHL + ISL + PHL = 13.0 + 0.4 + 4.7 = 18.1 feet
If the THL is greater than 20 feet, increase the pipeline diameter and redesign.

Curt Moore

From: Gerald Williams [gwilliams@grwei.com]
Sent: Tuesday, October 02, 2012 10:04 AM
To: 'Jennifer Zung'; Curt Moore
Subject: RE: Blue Indian Review Comments

Jennifer:

The submitted letter and attached calculations look good except for one thing: the NPSHa of 15.5 feet = 6.7 PSI, not 36 PSI. The conversion factor was applied the wrong direction.

DEQ requires 20 psi minimum to the hydrant, but this is not connected to a public water system. Typically what I see required is a minimum of 5psi as a safety factor that there will not be a vacuum break when pumping from the hydrant, but the required minimum will be what the fire chief/marshall requires. Please confer with that person as to what minimum pressure they need to have (20 psi is 46.2 feet and not available for any of the pond and dry hydrant solutions, so I know that cannot be the criteria), and then report back as to the requirement and that your design meets it.

Gerald R. Williams, P.E., CFM, President



208 359-5353 Voice 343 E 4th N, Ste 117
208 313-5383 Cell Rexburg, ID
208 359-8181 Fax 83440-6003
GWilliams@grwei.com www.grwei.com

-----Original Message-----

From: Jennifer Zung [<mailto:jnzung@harmonydesigninc.com>]
Sent: Monday, October 01, 2012 10:25 AM
To: Curt Moore
Cc: Gerald Williams; mhail@sagerg.com
Subject: RE: Blue Indian Review Comments

Hi Curt,

See attached response to the engineering review comments for Blue Indian.

Jen

From: Gerald Williams [<mailto:gwilliams@grwei.com>]
Sent: Thu 9/27/2012 4:38 PM
To: Jennifer Zung
Cc: 'Curt Moore'
Subject: Blue Indian Review Comments

See attached for revised comments.

Gerald R. Williams, P.E., CFM, President



IDAHO DEPARTMENT OF FISH AND GAME
UPPER SNAKE REGION
4279 Commerce Circle
Idaho Falls, Idaho 83401

C.L. "Butch" Otter / Governor
Cal Groen / Director

November 12, 2009

To Whom It May Concern:

RE: Blue Indian Subdivision

Idaho Department of Fish and Game (Department) staff reviewed the preliminary plat for the Blue Indian Subdivision last April, 2009. This proposed development consists of 44 building lots and is located west of the Teton River Horseshoe Creek area, Teton County, Idaho

We advised that the developers of this project should be required to provide mitigation commensurate with the loss of public wildlife and their habitats.

In September 2009, I met with Chet Kasper to inspect a wildlife corridor plan and give some suggestions on plant species for the corridor.

We have reviewed the October 16, 2009 Wildlife Corridor Planting Plan.

Although the corridor is not as wide as we would like it, it could provide passage if the vegetation was well established and covenants are enforced.

We approve the plan and recommend that the drainage is established and corridor lined out. We don't expect it to be planted this year

With sales slow, this could be put off again and again.

This will ensure the corridor is completed.

Thank you for providing us an opportunity to comment on this proposed development.

Sincerely,

Paul J. Faulkner
Regional Habitat Biologist

Curt Moore

From: Faulkner,Paul [paul.faulkner@idfg.idaho.gov]
Sent: Monday, October 01, 2012 12:09 PM
To: Curt Moore
Subject: Blue Indian Sub

Curt,

This is a follow up on our phone conversation about Blue Indian Subdivision – phase 2.

With no major changes, please use the recommendation in our Nov 12, 2009 letter.

Thanks, Paul

Paul J. Faulkner
Idaho Department of Fish and Game
Regional Wildlife Habitat Biologist
Upper Snake Region
4279 Commerce Circle
Idaho Falls, ID 83401
208-390-0617
paul.faulkner@idfg.idaho.gov



TETON COUNTY FIRE PROTECTION DISTRICT

P.O. Box 474

911 North Hwy. 33

Driggs, ID 83422

Marc Anderson, Fire Marshal

Phone: 208-354-2760

Fax: 208-354-2764

11 July 2012

Teton County Planning & Zoning
150 Courthouse Drive – Room 107
Driggs, ID 83422

Attention Angie Rutherford

Re: Blue Indian Subdivision Phase II

Dear Angie,

I have reviewed the plans pertaining to Phase II of the Blue Indian Subdivision and have determined that they meet the requirements as outlined in the 2009 International Fire Code. Mr. Hail has been informed that prior to any construction in Phase II, roads and the final water source shall be in place.

If you have any additional questions, please feel free to contact me at your convenience.

Sincerely,

A handwritten signature in black ink, appearing to read "Marc Anderson", with a long, sweeping tail.

Marc Anderson.

cc: Matt Hail



TETON COUNTY OFFICE

820 Valley Centre Drive
Driggs, Idaho 83422
208.354.2220 • fax 354.2224
www.phd7.idaho.gov

Promoting the Health of People & Their Environment

2 October 2012

Curt Moore
Teton County Planning and Zoning
150 Courthouse Drive
Driggs, ID 83422

TETON COUNTY
PLANNING & ZONING
OCT 02 2012
RECEIVED

RE: Blue Indian Subdivision

Dear Mr. Moore:

Eastern Idaho Public Health District approves the Master Plan and Final Plat (revised 2 March 2012) for Blue Indian Subdivision, Phase 2. Attached are the Sanitary Rules/Regulations and Health Certificate for this development. Please ensure this sanitary information is properly recorded with the final plat and that the cover page contains the attached Health Certificate language.

If you have any additional questions, please give me a call.

A handwritten signature in black ink, appearing to read "M. Dronen", with a long horizontal flourish extending to the right.

Michael Dronen, EHS
Eastern Idaho Public Health District

Atchs: Sanitary Rules and Regulations
Health Certificate

cc. Matt Hail
Harmony Design & Engineering

**SANITARY RULES AND REGULATIONS
BLUE INDIAN SUBDIVISION, PHASE 2
(Section 26, T5N, R44E)**

The subject land development has been reviewed for sanitary restrictions described in Idaho Code Section 50-1326. The following comments are intended to inform and educate all parties as to the sewage disposal and/or potable water situations particular to this development. **These comments are to be recorded and available for review with the final plat.**

Sewage Disposal:

An on-site evaluation, plat review and records search has confirmed individual subsurface sewage disposal systems will be allowed in accordance with IDAPA 58.01.03 and the Technical Guidance Manual for Individual and Subsurface Sewage Disposal. All Idaho Rules must be met. Site suitability criteria and required separation distances are to be maintained. Lots adjacent to, or including surface water features, must allow for adequate separation distance between the surface water and sewage disposal system. **A septic permit application must be submitted to the Eastern Idaho Public Health District, and a permit approved, prior to building on any lot.** To receive a permit, the applicant will be required to submit a detailed plot plan and building plans. An evaluation of site specific test hole(s) will be necessary for permit approval.

Potable Water:

Individual well drilling is authorized by the Idaho Department of Water Resources.

These lots are subject to all applicable public health and sanitation regulations, as well as, county ordinances. No inhabitable dwelling shall be constructed without a valid sewage disposal permit.

The following Health Certificate is to be placed on the plat and signed by Eastern Idaho Public Health District prior to recording with the county.

Health Certificate

SANITARY RESTRICTIONS AS REQUIRED BY IDAHO CODE, TITLE 50, CHAPTER 13 HAVE BEEN SATISFIED SUBJECT TO THE INFORMATION CONTAINED IN THE ATTACHED SANITARY RULES AND REGULATIONS. SANITARY RESTRICTIONS MAY BE REIMPOSED, IN ACCORDANCE WITH SECTION 50-1326, IDAHO CODE, BY THE ISSUANCE OF A CERTIFICATE OF DISAPPROVAL.

DISTRICT HEALTH DEPARTMENT, EHS

DATE