

**ENVIRONMENTAL ASSESSMENT
AND
COMMUNITY IMPACT STATEMENT**

**FOR
BRIDGER CREEK SUBDIVISION PHASES 2 & 3
BOZEMAN, MONTANA**

JANUARY, 1996

**PREPARED BY: MORRISON-MAIERLE/CSSA
901 TECHNOLOGY BLVD.
P.O. BOX 1113
BOZEMAN, MONTANA 59715**

**Written By: Keith S. Belden, P.E.
Reviewed By: Jack Schunke, P.E.**

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TABLE OF CONTENTS

INTRODUCTION

PRELIMINARY PLAT APPLICATION

MDHES/LOCAL GOVERNMENT FORM "SUB 1"

ENVIRONMENTAL ASSESSMENT

- SURFACE WATER
- GROUNDWATER
- GEOLOGY
- SOILS/SLOPE
- VEGETATION
- WILDLIFE
- HISTORICAL FEATURES
- VISUAL IMPACT
- PROTECTIVE MEASURES

COMMUNITY IMPACT

- WATER
- SEWAGE DISPOSAL
- STORMWATER MANAGEMENT
- SOLID WASTE DISPOSAL
- ROADS
- UTILITIES
- EMERGENCY SERVICES
- SCHOOLS
- LAND USE
- HOUSING
- PARKS
- TAXATION

FLOOD HAZARD EVALUATION

APPENDIX

LOCATION MAPS

SITE AERIAL

SCS SOILS DATA

"FIRM" MAP

WETLANDS ON-SITE EVALUATION (Schafer Letter)

STORMWATER ANALYSIS

WATER SYSTEM ANALYSIS

STORY MILL ROAD BRIDGE PLAN

AMENDMENTS TO COVENANTS

PREAPPLICATION PLAN CONDITIONS

LETTERS

RESPONSES

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January 11, 1996

INTRODUCTION AND SUMMARY

Bridger Creek Subdivision, Phases 2 and 3, is a 92 lot development consisting of 47 single family lots and one condominium lot in Phase 2 and 44 single family lots in Phase 3. Both phases have previously been annexed and zoned R-3, medium density residential.

The subdivision lies north of Bridger Creek and south of the City of Bozeman Landfill astraddle McIlhattan Road. Primary access is provided by McIlhattan Road and Story Mill Road.

Phase 2, which is to be constructed during the summer of 1996 lies west of McIlhattan Road surrounded on all sides by a portion of Bridger Creek Golf Course. It is the intention of Golf Course Partners, Inc. to provide a single access to Phase 2, requesting a waiver to the provisions of Section 16.12.040.M of the Bozeman Area Subdivision Regulations to provide a second access due to physical constraints. The principle physical constraints are:

- Elevation of McIlhattan Road above the site would require excessive embankment through a natural area compromising the stormwater master plan and attractiveness of the golf course.
- Alternative routes dissecting the fairway of Hole No. 14 would not be compatible with the existing golf course.

This submittal also proposes to serve Phase 2 with a single 8-inch watermain and internally looped water system. As shown in the COMMUNITY IMPACT STATEMENT (CIS), adequate pressure and flow can be maintained via a single feed system. We are proposing that the "single feed" option be conditionally approved and a looped system be constructed when one of the following occurs:

- 50% buildout of Phase 2;
- Five years have elapsed from the filing of the Phase 2 Final Plat;
- Filing the Final Plat for Phase 3.

The construction of Phase 3 scheduled for 1998 or 1999 will complete the proposed looped water system and be the final phase of Bridger Creek Subdivision which had its beginnings in 1985 with designs of the golf course and eventual acquisition of a Conditional Use Permit (C.U.P. #Z-9148). Phases 2 and 3 are built within and around the back nine holes and driving range in conformance with the conditions of C.U.P. Z-9148 and subsequent annexation agreement and Ordinance No. 1373 amending the City's Zone Map. It is extremely important to keep this in mind when reviewing the Preliminary Plat: Golf Course Partners, Inc. was required to construct the golf course first prior to the City of Bozeman giving serious consideration

to master planning any of the infrastructure. So it is that we find Phase 2 limited to one access which is adequate for residential development.

This project shall provide for the following infrastructure improvements and amenities:

- Widening of the Story Mill Road Bridge from 24 feet to 30 feet and reconstruction of the west shoulder of the bridge approaches at an estimated cost of \$89,700.00 including engineering;
- Pavement overlay of McIlhattan Road (Phase 2), (\$14,600.00) and extension of paved road to project boundary (Phase 3), (\$74,400.00)
- Extension of City water to Phase 2 including two crossings of Bridger Creek at an estimated cost of \$100,000.00, including engineering;
- Looped water system as part of Phase 3 at an estimated cost of \$178,000, including engineering;
- Construction of an irrigation system utilizing a portion of the golf courses' water rights to provide irrigation water to Phases 2 and 3 at an estimated cost of \$96,000, thereby reducing the impact upon the City's water supply;
- Extension of the city sewer collection system into Phase 2 and Phase 3. Improvement costs are estimated as follows: Phase 2 = \$150,000; Phase 3 = \$212,000.
- Utilization of natural features to provide superior stormwater treatment;
- Parkland dedication in excess of that required by law. Parkland shall serve principally as a buffer to the active portion of the landfill and as a trail corridor between McIlhattan Road and Story Mill Road;
- General public access to Bridger Creek and the East Gallatin River, although no trail corridors shall be provided because their use is not compatible with the golf course;
- Preservation of natural areas, wetlands and open space within the golf course.

It is our contention that the Preliminary Plat for Phases 2 and 3 of Bridger Creek Subdivision be reviewed with the foregoing in mind and that the appropriate waivers be granted, that adequate but not excessive infrastructure be required to serve the development and that the parkland dedication as shown on the plat be accepted.

CARNEGIE BUILDING, 35 NORTH BOZEMAN
P.O. BOX 640, BOZEMAN, MONTANA 59715
(406) 582-2360 FAX: (406) 582-2363

SUBDIVISION PRELIMINARY PLAT APPLICATION

-
1. Name and Address of property owner: Rex Easton, Pres of Golf Course Partners
9315 Cougar Drive, Bozeman, MT 59715
 2. Name and Address of applicant/representative: Keith S. Belden, PE
Morrison-Maierle, Inc., P.O. Box 1113, Bozeman, MT 59715
 3. Name of Subdivision: Bridger Creek Subdivision, Phase 2 & 3
 4. Minor Subdivision: _____ Major Subdivision: X
 5. Location (Legal) A tract of land located in the NE 1/4 of Sec 1, T1S, R6E, P.M.M.
 6. Total Acres: 56.60 Gross: 56.60 Net: 40.98
 7. School District: Bozeman School District #7 Fire District: City of Bozeman
 8. Date of Pre-Application Review: November 2, 1995
 9. Indicate the proposed use(s) and number of lots or spaces in each:
 - 91 Residential, Single family
 - _____ Residential, multiple family (specify)
 - _____ Planned Unit Development (number of units)
 - 1 lot/4units Condominium (number of units)
 - _____ Townhouse (number of units)
 - _____ Recreation of Second Home
 - _____ Mobile Home Park
 - _____ Recreational Vehicle Park
 - _____ Commercial or Industrial
 - _____ Other (please describe)
 10. Current land use: Agricultural
Existing zoning or other regulations: Bozeman R3
Depth to groundwater: 5.0' Depth to Bedrock, etc. >8'
 11. Review Fee: Minor Subdivision: \$125 plus \$3 per lot
Major Subdivision: \$200 plus \$3 per lot to 100 lots, then \$1 per lot for each lot in excess.

Please refer to the Subdivision Procedures form for the number of copies and supplemental information needed. The correct number of copies plus one copy of the completed Subdivision Procedures form must be submitted, with the appropriate fee, or the application will not be accepted. This application form must be signed by the applicant and the property owner (if different).

I (we) hereby certify that the above-information is true and correct to the best of my (our) knowledge.

Golf Course Partners
Applicant Signature
Date: 1-10-96

Keith S. Belden President
Property Owner's Signature
Date: 1-10-96

Applicant Signature
Date: _____

Property Owner's Signature
Date: _____

Applicant Signature
Date: _____

Property Owner's Signature
Date: _____

SUB 1

Montana Department of Environmental Quality/
Local Government Joint Application Form

No. _____

PART I. GENERAL DESCRIPTION AND INFORMATION

1. Name of proposed development Bridger Creek Subdivision - Phases 2 and 3

2. Name, address and telephone number of landowner, and representative, if any (e.g., engineer, surveyor).

OWNER/APPLICANT	ENGINEER/SURVEYOR
Rex Easton, President	Keith Belden, PE
Golf Course Partners, Inc.	Morrison-Maierle, Inc.
9315 Cougar. Dr.	P.O. Box 1113
Bozeman, MT 59715 Ph: #587-8328	Bozeman, MT 59715

3. Location (City and/or County) Bozeman, Gallatin County

Legal Description: ___ 1/4 NE 1/4 of Section 31 Township 1S Range 6E

4. Is concurrent review by the local governing body and MDEQ requested?
MDEQ to review as Masterplan exemption.
Yes X No _____

5. Type of wastewater treatment system: Individual or shared on-site septic system ___. Multiple-family on-site system (3-9) ___. Service connection to multiple-family system ___. Service connection to public system ___. Extension of public main X. New public system ___.

6. Type of water supply system: Individual or shared well ___. Individual cistern ___. Individual surface water supply or spring ___. Multiple-family water supply system (3-9) ___. Service connection to multiple-family system ___. Service connection to public system ___. Extension of public main X. New public system ___.

7. Name of solid waste (garbage) disposal site Bozeman Landfill

8. Is information included which substantiates that there will be no degradation of state waters or that degradation will be non-significant? _____

If not, have you enclosed an Application to Degrade? _____

9. Descriptive Data:
 - a. Number of lots or rental spaces 92
 - b. Total acreage in lots 40.78
 - c. Total acreage in streets or roads 8.89
 - d. Total acreage in parks, open space, and/or common facilities 6.93
 - e. TOTAL gross acreage of subdivision 56.6
 - f. Minimum size of lots or spaces 0.26 Ac
 - g. Maximum size of lots or spaces 1.01 Ac

10. Indicate the proposed use(s) and number of lots or spaces in each:

- 91 Residential, single family
- Residential, multiple family
- Types of multiple family structures and numbers of each (e.g., duplex, 4-plex)
- Planned Unit Development (No. of units)
- 1 Condominium (No. of units 4)
- Mobile Home Park
- Recreational Vehicle Park
- Commercial or Industrial
- Other (please describe)

11. Provide the following information regarding the development:

- a. Current land use agriculture
- b. Existing zoning or other regulations Bozeman R3 medium density residential
- c. Depth to groundwater at the time of year when water table is nearest to the natural ground surface within the drainfield area NA
- d. Depth to bedrock or other impervious material in the drainfield area NA
- e. An overall development plan indicating the intent for the development of the remainder of the tract, if a tract of land is to be subdivided in phases. "See plot"
- f. Drafts of any covenants and restrictions to be included in deeds or contracts for sale. "On file with Gallatin County Recorder"
- g. Drafts of homeowners' association bylaws and articles of incorporation, if applicable.

(Submitting a draft copy of a homeowners' association bylaws and articles of incorporation is adequate for DEQ to initiate and complete its review of sanitary facilities, but a copy of the fully executed documents must be submitted before DEQ can issue final approval.)

PART II REQUIRED INFORMATION FOR APPROVAL OF SANITARY FACILITIES UNDER
SANITATION IN SUBDIVISIONS LAW * See EA/CIS

A. PHYSICAL CONDITIONS

1. Provide the following attachments:
 - a. A vicinity map showing the location of the proposal relative to the nearest town, highway or street system.
 - b. Map of soil types or soils survey and, if available, interpretation of soil suitability for the proposed land uses.
 - c. Topographic map of the development with contour intervals meeting the preliminary plat requirements of the local subdivision regulations.
 - d. On one or more copies of a preliminary plat* (a minor subdivision plat if applicable) prepared in accordance with local subdivision regulations, or a final plat, show the location of:
 - 1) any rock outcroppings.
 - 2) any areas subject to flood hazard or, if available, 100 year floodplain studies. (The Floodplain Management Section of the Water Resources Division of the Department of Natural Resources and Conservation may be contacted for assistance in determining flood hazard locations.)
 - 3) any natural water systems such as streams, rivers, intermittent streams, lakes or marshes (also indicate the names and sizes of each).
 - 4) any man-made water systems such as canals, ditches, aqueducts, reservoirs and irrigation systems (also indicate the names, sizes and present use of each).
 - 5) any existing or proposed utilities located within or adjacent to the subdivision, including electrical power, natural gas, telephone service.

*Submitting a preliminary plat is adequate for DEQ to initiate and complete its review of sanitary facilities, but a copy of the final plat must be submitted before DEQ can issue final approval.

B. WATER SUPPLY

1. Where an individual water supply system is proposed for each parcel:
 - a. Indicate the distance to the nearest public water system.
 - b. If wells or springs are to be used, provide evidence that groundwater supply meets DEQ standards for quantity, quality and dependability (e.g., well logs, chemical analyses). Where acceptable tests cannot be conducted, a hydrogeological report, which substantiates adequate quantity and quality of the water supply shall be submitted.
 - c. If cisterns are to be used:
 - 1) explain why cisterns are proposed.
 - 2) identify the source of water supply and provide evidence that it is of sufficient quantity and quality to serve the development.
 - 3) explain what provisions will be made for sanitary hauling of water.
 - d. Attach two copies of the plat showing the proposed location of each spring, well or cistern and indicating the distance to existing or proposed wastewater treatment systems.

2. Where a public or multiple family water system is proposed:
 - a. Estimate the number of gallons per day required by the development when fully developed (include required volume for domestic, fire protection and irrigation use if applicable).
 - b. Where an existing system is to be used:
 - 1) identify the system and the person, firm or agency responsible for its operation and maintenance.
 - 2) indicate the system's capacity to handle additional use and its distance from the development.
 - 3) provide evidence that permission to connect has been granted.
 - 4) provide two copies of the following attachments:
 - a) map or plat showing location and sizes of any existing water supply lines and facilities which may directly serve parcels within the proposed development.
 - b) engineering plans and specifications for all proposed extensions and additional lines and facilities. (In applying for DEQ review, plans must be in sufficient detail to indicate sizes of lines and facilities and the capacity of the system. Complete plans and specifications must be submitted for final approval by DEQ.)
 - c. Where a new system is to be used:
 - 1) provide evidence that the water supply is adequate in quantity, quality and dependability.
 - 2) indicate who will install the system, who will bear the costs.
 - 3) provide two copies of the following as attachments:
 - a) a plan for operation and maintenance of the system.
 - b) engineering plans and specifications for the system. (When applying for DEQ review, plans must be in sufficient detail to indicate sizes of lines and facilities and the capacity of the system. Complete plans and specifications must be submitted for final approval by DEQ.)

C. WASTEWATER TREATMENT

1. Where individual wastewater treatment systems are proposed for each parcel:
 - a. Indicate the distance to the nearest public wastewater treatment system.
 - b. Provide as attachments:
 - 1) two copies of the plat which show the proposed suitable location on each lot for a septic tank, a subsurface treatment system and a 100% replacement area for the subsurface treatment system. Show the location of neighboring wells and subsurface treatment systems and the distances to each.
 - 2) the results of percolation tests performed on each lot in the area of the proposed drainfield in accordance with WQB-6. Each test hole shall be keyed by a number on a map of the report.
 - 3) a detailed soils description or map. If a soils description is not available or if high ground water or impervious layers are suspected, provide soils profile showing soil strata from test holes at least 7 feet in depth in the drainfield area. (Note: all major subdivisions require the 7 foot test holes.)
2. For a proposed public or multiple family wastewater treatment system:
 - a. Estimate the average number of gallons of wastewater generated per day by the

development when fully developed.

b. Where an existing system is to be used:

- 1) identify the system and the person, firm or agency responsible for its operation and maintenance.
- 2) indicate the system's capacity to handle additional use and its distance from the development.
- 3) provide evidence that permission to connect has been granted.
- 4) provide two copies of the following attachments:
 - a) map or plat showing location and sizes of any existing sewer lines and facilities which may directly serve parcels within the proposed development.
 - b) engineering plans and specifications for all proposed extensions and additional lines and facilities. (In applying for DEQ review, plans must be in sufficient detail to indicate sizes of lines and facilities and the capacity of the system. Complete plans and specifications must be submitted for final approval by DEQ.)

c. Where a new system is to be used:

- 1) indicate who will install the system, who will bear the costs, when it will be completed and who will own it.
- 2) provide as an attachment:
 - a) engineering plans and specifications for the proposed system. (When applying for DEQ review, plans must be in sufficient detail to indicate sizes of lines and facilities and the capacity of the system. Complete plans and specifications must be submitted for final approval by DEQ.)
 - b) a plan for operation and maintenance of the system.

D. SOLID WASTE

1. Describe the proposed method of collecting and disposing of solid waste from the development.
2. If use of an existing collection system or disposal facility is proposed, indicate the name and location of the facility.
3. If on-site disposal of solid waste is proposed:
 - a. indicate location and size of proposed site and provide engineering drawings of the landfill.
 - b. explain what measures are planned to prevent contamination of surface water or groundwater supplies.
 - c. indicate who will install the facility, who will bear the cost, when it will be operational, and who will own, operate and maintain the system.
 - d. provide as an attachment a plan which includes:
 - 1) an analysis of soils and hydrology indicating pollution potential.
 - 2) seasonal high groundwater.
 - 3) method of operation and maintenance.

E. DRAINAGE

1. Streets and roads.
 - a. Describe measures for disposing of storm run-off from streets and roads within the subdivision or onto adjacent property.

- b. Indicate type of road surface proposed.
- c. Describe facilities for stream or drainage crossing (e.g., culverts, bridges).

2. Other problems.

- a. Describe how surface run-off will be drained or channeled from parcels.
- b. Indicate if storm run-off will enter state waters and describe any proposed treatment measures.
- c. Describe any existing or proposed streambank or shoreline alternation, any proposed construction or modification of lake beds or stream channels. Provide information on location, extent, type and purpose of alternation.

It is hereby agreed that if the attached plans dated _____ or any revision or amendment thereof are approved by the Department of Environmental Quality, installation of the water supply and wastewater treatment facilities will be made in accordance with the details thereof as shown as such approved plans. If the subdivided lands shown on such plans are sold before such installations are made, it is agreed that all purchasers of lots will be furnished with a legible reproduction of the approved plans and they will be notified of the necessity of making installations in accordance with such approved plans.

Signature Rex B. Easton Rex B. Easton
(Print name of land owner)

Official Title President

Date 1-10-96

(The statement must be signed by the owner of the land platted for subdivision or the responsible official of the company or corporation offering the same for sale.)

PART III INFORMATION REQUIRED FOR ENVIRONMENTAL ASSESSMENT UNDER THE
SUBDIVISION AND PLATTING ACT * See EA/CIS

Information specified in this Part must be provided in addition to that required in Parts I and II of this application form, when the local subdivision regulations require that an environmental assessment be prepared for subdivision.

A. GEOLOGY

1. Locate on a copy of the preliminary plat, or on a plat overlay, any known hazards affecting the development which could result in property damage or personal injury due to:
 - a. falls, slides or slumps -- soil, rock, mud, snow.
 - b. seismic activity.

B. VEGETATION

1. Locate on a copy of the preliminary plat, or on a plat overlay, the location of the major vegetation types such as marsh, grassland, shrub, forest.
2. Describe measures to be taken to protect trees and vegetative cover (e.g., design and location of lots, roads and open spaces).

C. WILDLIFE

1. What major species of fish and wildlife use the area to be affected by the proposed subdivision?
2. Locate on a copy of the preliminary plat, or on a plat overlay, any known important wildlife areas, such as big game winter range, waterfowl nesting areas, habitat for rare or endangered species and wetlands.
3. Describe any proposed measures to protect wildlife habitat or to minimize degradation (e.g., keeping buildings and roads away from shorelines or setting aside marshland as undeveloped open space).

D. HISTORICAL FEATURES

1. Describe and locate on a copy of the preliminary plat, or on a plat overlay, any known or possible historic, archaeological or cultural sites which may be affected by the proposed subdivision.
2. Describe any plans to protect such sites or properties.

E. ROADS

1. Describe any required construction of new public or private access roads or substantial improvements to existing public or private access roads.
2. Describe the proposed closure or modification of any existing roads.
3. Explain why access was not provided by means of a road within the subdivision, if access to any of the individual lots is directly from arterial streets or roads.
4. Indicate who will pay the costs of installing and maintaining dedicated and/or private roadways.

5. Estimate how much daily traffic the development, when fully developed, will generate on existing streets and arterials.
 - a. Discuss the capability of existing and proposed roads to safely accommodate this increased traffic.
 - b. Describe any increased maintenance problems and cost that will be caused by this increase in volume.
6. Is year-round access by conventional automobile over legal rights-of-way available to the subdivision and to all lots and common facilities within the subdivision?
7. Identify the owners of any private property over which access to the subdivision will be provided.

F. UTILITIES

1. Indicate the utility companies involved in providing electrical power, natural gas, or telephone service. To what extent will these utilities be placed underground?
2. Has the preliminary plat been submitted to affected utilities for review?
3. Estimate the completion date of each utility installation.

G. EMERGENCY SERVICES

1. Describe the emergency services available to the residents of the proposed subdivision, including number of personnel and number of vehicles or type of facilities and road distance to facilities for:
 - a. fire protection -- is the proposed subdivision in an urban or rural fire district? If not, will one be formed or extended? In absence of a fire district, what fire protection procedures are planned?
 - b. Police protection.
 - c. Ambulance service.
 - d. Medical services.
2. Can the needs of the proposed subdivision for each of the above services be met by present personnel and facilities?
 - a. If not, what additional expenses would be necessary to make these services adequate?
 - b. At whose expense would the necessary improvements be made?

H. SCHOOLS

1. Describe the available educational facilities which would serve this subdivision and the road distance to each.
2. Estimate the number of school children that will be added by the proposed subdivision. Provide a statement from the administrator of the appropriate school system indicating whether the increased enrollment can be accommodated by the present personnel and facilities and by the existing school bus system.

I. LAND USE

1. Describe land uses on lands adjacent to the subdivision.
2. Describe any comprehensive plan or other land use regulations covering the area proposed for subdivision or adjacent land. If located near an incorporated city or town, is annexation proposed?
3. Where public lands are adjacent to or near the proposed development, describe the present and anticipated uses of those lands, e.g., grazing, logging, recreation. Describe how the subdivision will affect access to any public lands.
4. Describe any health or safety hazards on or near the subdivision, such as mining activity, high pressure gas lines, dilapidated structures, high voltage power lines or irrigation ditches. Any such conditions should be accurately described and their origin and location identified.

J. PARKS AND RECREATION FACILITIES

1. Describe part and recreation facilities to be provided within the proposed subdivision and other recreational facilities which will serve the subdivision.

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ENVIRONMENTAL ASSESSMENT

SURFACE WATER

Phase 2, sitting astride old stream channel deposits, is generally bounded on the south by Bridger Creek and on the west by the East Gallatin River. An irrigation ditch conveying water to a series of ponds for irrigation and aesthetic purposes, hugs the southerly border of the developable lands. Open space comprised of groves of quaking aspen, natural and manmade ponds, wetlands and old river channel sections skirt the northerly edge of the developable land as do Hole Numbers 14, 15 and 16.

Phase 3 is situated upon old alluvial fan deposits and has no live water courses within its boundaries. A sizeable swale traverses through Phase 3 from northeast to southwest exiting under McIlhattan Road via a culvert.

A portion of Lot 32 and the Phase 2 access road lies within the designated floodplain or zone as defined on the Flood Insurance Rate Map (FIRM) panels 5 and 8 of 21, City of Bozeman, Gallatin County.

The riparian habitats and wetland areas have been and shall continue to be preserved and protected through the adherence to the following practices:

- Minimum 200 foot residential setback from the East Gallatin River and Bridger Creek;
- No-build alternative in wetland areas such as the quaking aspen grove lying northeast of Phase 2. It is through this area that some have suggested that a second access could be constructed resulting in loss of wetlands and degradation of the golf course "which was here first";
- Utilization of golf course fairways and roughs, manmade ponds, wetlands and heavy vegetation for surface runoff detention/retention and treatment prior to it entering the East Gallatin River.

As part of the plan to protect and conserve surface waters, application will be made to the Soil Conservation Service for a 310 permit to discharge treated stormwater to the East Gallatin River. Concurrent with the 310 permitting action we will be applying for a Stormwater Discharge Permit from MDEQ.

We visited the site with a representative from Schafer and Associates to assess and review wetlands that might be impacted by runoff from Phases 2 and 3. After a review of our preliminary stormwater plan and discussions with MDEQ and Corps of Engineers (COE) personnel, it appears that a 404 Permit will not be required. When

we submit our stormwater master plan to MDEQ, we shall also submit it to COE as a matter of professional courtesy. (See Schafer letter in the Appendix under Wetlands On-Site Evaluation.)

GROUNDWATER

High groundwater to a depth of 3.7 feet below the surface has been observed in Phase 2. Groundwater in Phase 3 is greater than 8.0 feet below the surface. Currently we are monitoring groundwater levels at four monitoring wells in Phase 2. See Preliminary Plat for well location and data. (Our wells are not to be confused with those being monitored by the landfill for groundwater pollution.)

Phases 2 and 3 shall be served by City water and sewer thereby avoiding impacts to the groundwater through overuse and contamination by septic tanks. We shall continue to monitor groundwater levels through the spring to better assess the need for special construction techniques and materials during construction of the utilities and roads. It is likely that the use of separation fabrics in the roadway may be desirable and it is a near certainty that pumping of groundwater will be necessary in order to dewater utility trenches.

The covenants shall be amended to prevent the construction of basements in Phase 2, although basements shall be permitted in Phase 3. The covenants and existing Weed Management Plan for Phase 1 addresses the use of pesticides and herbicides and restricts their use to that recommended by the manufacturers' and Federal, State and Local law.

The applicant intends to supply irrigation water to Phase 2 and 3 conserving City water supplies and groundwater supplies.

GEOLOGY - SOILS - SLOPES

Geologic Hazards.

There are no known geologic hazards associated with this site other than its inclusion within Seismic Zone 3.

Protective Measures.

No special protective measures are proposed for the site. It is subject to the same Seismic Zone 3 construction standards as is the entire Bozeman area. (Seismic Zone 1 having the lowest earthquake potential, Zone 4 having the greatest.)

Unusual Features.

Phase 2 gently slopes to the northwest at slopes ranging from 0-4 percent. Seasonally high groundwater shall prevent the construction of basements. As discussed below, the stream channel deposits underlying Phase 2 are highly expansive in nature requiring a standard of construction commonly practiced in the Bozeman Area where expansive soils are frequently encountered.

Phase 3 on the other hand is comprised of alluvial fan deposits where the slopes range from 3 to 16 percent. There are no known slope instabilities or areas of seasonally high groundwater. The soils are moderately expansive requiring the same standard of care when constructing roads, utilities, and houses as practiced where highly expansive soils are encountered.

SOILS MAP

Your attention is directed to the Appendix where a soils map and relevant soils data are located in the section entitled - SCS SOILS DATA.

All construction shall occur within two soil map units:

- Phase 2 - 509B Enbar Loam
- Phase 3 - 450D Blackdog-Brodyk Silt Loams

Test hole and groundwater monitoring data at both sites is in agreement with the SCS soils information. Soil limitations including expansive potential and seasonally high groundwater were addressed earlier in this report.

All road construction material shall be imported. The soils at the site are unsatisfactory as a source for road building gravels. With respect to site development, the soil limitation will restrict the use of basements to Phase 3 only. Shallow excavations for utilities are routinely accomplished in unstable soils by dewatering the work zone and installing shoring or trench boxes in conformance with Federal and State Law.

A sub-consultant, Schafer & Associates, visited the site and does not believe that there are hydric soils or wetlands within the boundary of Phase 2. Wetlands do exist along the margins of Phase 2. These wetlands which, occur in the 537A, 556A and 606A soil map units and along the fringe of unit 509B, are a functional part of the golf course with three interconnected ponds fed by an existing irrigation ditch, groundwater and runoff. The ponds, which were constructed or enhanced during the development of the golf course, will serve as reservoirs to supply irrigation water to the lots within Phases 2 and 3. It is also planned that these enhanced wetlands shall

serve as the stormwater treatment system. (Refer to the section on Surface Water in the Environmental Assessment (EA) and to the Water and Stormwater Management in the CIS.)

CUTS AND FILLS

Phase 3 roads and the approach to Phase 2 will require cuts and fills greater than 3 feet. The reconstruction of portions of McIlhatten Road will of necessity reshape existing cut slopes greater than 3' vertical feet.

The construction contract shall provide for the shaping, seeding and fertilization of all cut and fill slopes. Mulching or placement of biomats shall be investigated for use on larger slopes. The Stormwater Master Plan, as submitted to MDEQ, will detail all erosion control measures to be installed by the Contractor. Individual payment items for seeding and compliance with the Stormwater Masterplan shall be included in the Contract providing a monetary incentive to complete the required improvements as specified.

Additionally, the Covenants and Weed Control Plan will provide the Homeowners Association with some tools with which to enforce reseeding of disturbed areas and runoff control as individual homes are being constructed.

VEGETATION

A review of the site would show that there are three general vegetation categories:

- Cropland: The only vegetation type to be disturbed during development of Phase 2 and Phase 3. Currently planted in wheat.
- Golf Course: Seeded fairways, greens and tee boxes. The "roughs" include areas of seeded ground, cropland and native grasses.
- Riparian Vegetation: Quaking aspens, riparian shrubs and grasses.

The site aerial (see Appendix) clearly shows the various vegetation types. At the time that the aerial was taken, the holes (10 through 18) of the golf course were nearing completion. The greens and portions of the fairways can be seen.

All riparian vegetation shall remain undisturbed. The Covenants, Weed Control Plan and Stormwater Master Plan shall serve as guidelines to protect these aesthetic plant communities from damage.

WILDLIFE

The proposed development is currently home to white tailed deer, migrating waterfowl and various small birds and mammals. The East Gallatin River and Bridger Creek are home to rainbow trout, brown trout and grayling. Several other minor species of fish inhabit these streams including suckers.

Impacts to wildlife have been and continue to be mitigated through the preservation of open space and riparian corridors in accordance with CUP Z-9148 and comments from Montana Department of Fish, Wildlife and Parks dated September, 1986.

Of the original 287 acre parcel, approximately 115 acres will be developed as lots and roads with Phases 1, 2 and 3 of Bridger Creek Subdivision. The balance of the land is golf course, park land, open space or trails.

TABLE 1
AREA SUMMARY

PHASE	LOTS	ROADS	SUBTOTAL
1	56.03	8.39	64.42
2	15.04	4.46	19.50
3	25.74	4.43	30.17
TOTAL	96.81	17.28	114.09

The remainder of the 287 acre parcel equal to more than 170 acres shall continue to support a large population of white tailed deer and other mammals and birds. The riparian corridors and ponds shall also continue to support migratory birds and fish.

There are no known endangered or threatened species endemic to this location.

HISTORICAL FEATURES

A letter was sent to the State Historic Preservation Office soliciting comments regarding historical features at this site. Their response, dated January, 1996, indicated that there may be impacts to the old railroad and other sites not yet documented.

We responded with another letter that stated the following:

1. Artifacts of the railroad were removed over 30 years ago.
2. Phase 2 and 3 construction will occur on land that has been in agricultural production for longer than 30 years. No construction shall take place on undisturbed portions of the site.
3. Included is a copy of the letter dated July 12, 1993, from Department of Fish, Wildlife and Parks, that referenced a SHPO survey required to complete the FW & P easements for the Bridger Creek Subdivision Sewer Extension. We requested that they acquire a copy of this survey which neither we nor the applicant have.

Copies of all letters are included within the Appendix.

VISUAL IMPACTS

All three phases of Bridger Creek Subdivision and the golf course have been designed around a central theme of preserving the aesthetic environment. This has largely been accomplished by constructing the golf course in such a manner as to preserve large riparian corridors and promote wetlands through their preservation and enhancement. The housing developments are controlled through a set of proactive covenants and development guidelines that require underground utilities, revegetation of disturbed areas and weed control. They also restrict the use of utility poles for outdoor lighting and the installation of interior lot fencing. The architectural appearance of all homes are governed by these same covenants and design guidelines.

Golf Course Partners, Inc. has, through a thoughtful, determined plan achieved a visually satisfying arrangement of homes that provides recreation opportunities and protects habitats in a manner that the citizens of Bozeman may take pride in.

COMMUNITY IMPACT

WATER SUPPLY

The following discussion on water supply shall analyze the domestic and fire protection demands for Phases 1, 2 and 3 of Bridger Creek Subdivision and comment on the use of an applicant installed irrigation system utilizing existing water rights for Phases 2 and 3. A hydraulic analysis shall be performed on the existing Phase 1 and proposed Phase 2 and 3 System using Haestad Methods CYBERNET.

Water supply for domestic use (including landscape irrigation in Phase 1) and fire protection shall be provided by the City of Bozeman via a distribution system installed by Golf Course Partners, Inc. Water usage is based upon the following assumptions:

- 400 gallons per day per living unit.
- 4 units per acre for undeveloped residential and commercial land which is equal to 1600 gpd per acre.
- 1.5 inches per week over 50% of residential/commercial lot acres for irrigation.

TABLE 2
DAILY DEMAND
(gpd)

PHASE	RESIDENTIAL/COMMERCIAL		IRRIGATION		DEMAND TOTAL
	UNITS	DEMAND	ACRES	DEMAND	
1	180	72,000	56.03	163,000	235,000
2	51	20,400	-0-	-0-	20,400
3	44	17,600	-0-	-0-	17,600
TOTALS	275	110,000	56.03	163,000	273,000

NOTES:

1. Irrigation demand = 56.03 Ac x 43560 SF/Ac x 1.5 in/wk x 1 ft/12 in x 7.48gal x 1 wk/7 days x 50% = 163,000 gal.
cf

Analysis

Before the network analysis for Bridger Creek Subdivision began, base pressure data for the main supplies connecting Bridger Drive were acquired from the City of Bozeman. Pressures at the ten inch ductile iron pipe (DIP) at the Story Mill location and at the eight inch DIP supply on Birdie Drive, were recorded at 137 psi (See Exhibit "A", P1,P2, under Water System Analysis in the Appendix.) Subsequently pipe elevations for each junction node and Hazen-Williams roughness coefficients (C) for each pipe were appropriately assigned. "C" values for the latter were conservatively assumed using figures for 20 year-old cast iron pipe (i.e. 92.50 for 8" diam. and 94.25 for 10"dia. pipe.) Minor losses were considered insignificant and therefore omitted. The peak hour water demand (800 gal) was allocated to specific junction nodes by proportion, depending upon the number of units served by each phase and node. Fireflows were conservatively assumed using the UFC(1991) Type III, 1500 gpm requirement for multi-family dwellings.

The analysis begins with presentation of input data for the subsequent runs, showing parameters such as node and pipe numbers, diameter, length, C factors, etc.

The first model run illustrates base conditions present under the given pressure nodes and peak hour demand parameters. Results show a minimum pressure of approximately 100 psi (at the point of highest elevation) ranging to an upper limit of 145 psi (Phase 1 Birdie Dr./Boylan Dr.)

Fire Flows

The second run illustrates a "worst-case" scenario of two (2) simultaneous fireflows 1500 gpm each. These fireflows are placed at the low (J10) and high (J180) elevation points of the network. It should be noted that although J200 is higher in elevation, J180 represents more potential units and therefore was chosen as the point of analysis. Results show a minimum pressure of approximately 39 psi at the high elevation point and a maximum pressure of 115 psi (J40) at the terminal end of the 10" DIP-Story Mill Rd./Boylan Drive.

The third model run depicts the effects of 1500 gpm fireflows drawn separately at the junction nodes of Phase 2. Note also the Available Fire Flow values are set at 1750 gpm. These values only represent a practical constraint set by the modeler, and are not to be construed as absolute; further testing is required to ascertain the actual upper maximum. The purpose of the chosen value was to clarify minimum flow only. Results clearly show minimum flow (1500 gpm) and minimum (delivery) Residual pressure (20 psi) requirements are met at each junction node.

Similarly, results of the fourth model run clearly meet the requirements for Phase 3. It is proposed that Phase 2 will proceed towards buildout before initiation of Phase 3 in a time span of approximately five years. The final run employs a different roughness coefficient for five year-old cast iron pipe. This parameter was modified to illustrate more accurately the ability of Phase 2 to withstand a fireflow without the assistance of the 8" diameter loop through Phase 3. To effectively isolate Phase 2, pipe numbers P70 and P170 were closed. Since this scenario assumes an isolated loop in this particular phase, the model adjusts by opening P70 and reducing the demands in Phase 3 to zero. This enables the use of loop equations yet still isolates Phase 2. Results of drawing a fireflow of 1500 gpm and the residual demand of 73 gpm, produce a net pressure of 54 psi, well above the 20 psi delivery requirement.

Conclusion

Based upon thorough analysis, the proposed network for Bridger Creek Subdivision Phases 2 and 3 clearly provides adequate safety assurance in the event of a fire at any location within this subdivision. This analysis has also shown that isolation of Phase 2 will not jeopardize its firefighting ability for the occurrence of a fire during the proposed buildout time frame. Additionally, the data show some limited future expansion to the City of Bozeman pipeline grid can occur to the north along McIlhattan Road.

SEWAGE DISPOSAL

Sewage shall be collected in a central collection system installed by the applicant and carried to the City of Bozeman's Wastewater Treatment Plant located at Moss Bridge and Springhill Roads, where it shall be treated.

Phase 1 of this development required the construction of a trunk line from State Highway 10 to the subject project at a cost of \$295,000.00. This trunk line, consisting generally of 2300 lineal feet of 15-inch polyvinylchloride (PVC) main, 3500 lineal feet of 12-inch PVC main, 22 manholes and 2 creek crossings, was constructed during the summer of 1994. This same sewer was the subject of a sewer service area study completed in January, 1994 as part of the Annexation Agreement. This section of the Community Input Statement modifies the earlier study.

The following assumptions are the basis for our discussion:

- 4 living units per acre where densities are not precisely known, else use exact number of living units
- 2.5 persons per unit
- Sewage generation rate = 100 gpd per person

- Peaking Factor from Figure 1, WQB 2

$$PF = \frac{18 + \sqrt{P}}{4 + \sqrt{P}} \text{ where } P = \text{population in thousands}$$

TABLE 4
SEWER SERVICE AREA SUMMARY

BLOCK	AREA (AC)	1/94		12/95	
		PERSONS	PEAK FLOW (gpm)	PERSONS	PEAK FLOW (gpm)
1	70	700	160	700	163
2	88	880	201	880	205
3	23	230	53	130	30
4	35	350	80	110	25
5	84	840	191	480	112
6	150	1500	343	1500	349
TOTAL	450	4500	1028	3800	884

NOTES:

1. BLOCK 3: 51 units x 2.5 persons/unit = 128 persons: say 130
2. BLOCK 4: 44 units x 2.5 persons/unit = 110 persons
3. BLOCK 5: This area consists of 30 acres adjacent to Bridger Creek Subdivision Phase 1 with the following combination of units and raw land:
 - Single Family = 54 units (including Lot 41)
 - Multifamily = 86 units (including Lots 12, 29, 30, 42, & 45-50)
 - 9.87 Ac Raw Land = 40 units (including Lots 56 57, 58, & 62)
 - 180 units

 - 30.0 Ac Raw Land = 300 units
 - 480 units total for Block 5
4. PEAKING FACTORS:
 - January, 1994: $PF = \frac{18 + \sqrt{4.5}}{4 + \sqrt{4.5}} = 3.29$

$$\text{January, 1996: PF} = \frac{18 + \sqrt{3.8}}{4 + \sqrt{3.8}} = 3.35$$

5. TOTAL PEAK FLOWS:

January, 1994:

$$4500 \text{ persons} \times 100 \text{ gpd/person} \times 3.29 \div 1440 \text{ min/day} = 1028 \text{ gpm}$$

January, 1996:

$$3800 \text{ persons} \times 100 \text{ gpd/person} \times 3.35 \div 1440 \text{ min/day} = 884 \text{ gpm}$$

6. Peak flows in gpm for each block represent a percent of the total peak flow based upon a ratio of the Block population to the total population.

STORMWATER MANAGEMENT

Our stormwater management plan shall take advantage of the system of existing natural wetlands and of the existing golf course openspace and constructed ponds to provide extended detention time for stormwaters. The extended detention time within this unique system shall accomplish several goals established by the applicant:

1. Added detention time coupled with ample volume shall increase the removal rate for sediments, phosphorous, nitrogen, metals, hydrocarbons, Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD).
2. Water balance generally maintained in wetland since we will not be redirecting runoff along alternate pathways. Instead we shall take advantage of existing pathways.
3. Wetland system shall be used to capture 90% of the 2-year recurrence interval storms since it is this storm event that has the greatest effect on stream morphology. Streams generally exist in equilibrium with a 2-year event; urban development can cause a dramatic shift in the frequency of this runoff event causing streams in urban areas to cut deeper and wider in an attempt to reach another equilibrium point, all the while increasing erosion and degrading the stream bed.

Minimal stormwater infrastructure shall be required for this development. Phase 2 shall rely upon a street section that drains all of the runoff to the outside perimeter of the Augusta Drive loop. Runoff shall be collected at four points around the perimeter and conducted through curb chases into shallow swales. Runoff shall exit these swales and spill out onto the golf course in a sheet flow eventually reaching one of three different ponds before being discharged into one of two different wetland detention cells.

Phase 3 runoff shall be directed into one of two swales that traverse the land east of McIlhattan Road. For the swale that runs through the golf course south of Phase 3 no special measures are planned. The swale that traverses through the lots in this phase shall be protected by easement. The minimum driveway culvert size shall also be specified on the improvement plans and also appear on the Final Plat for Phase 3 and become a part of the covenants. At a minimum slope of 1.5% an 18-inch diameter culvert is more than adequate. (See calculations in the Appendix.) Our preliminary calculations also indicate that the minimum culvert crossing of McIlhattan Road should be 24-inches in diameter. A combination of curb openings and drop inlets to remove water from roadways directing in into the swales shall also be required.

In combination with our plans to capture and treat stormwater runoff we shall also formulate a plan to prevent unnecessary sedimentation. Stabilization of disturbed areas shall be our greatest concern; temporary stabilization followed by seeding will constitute the bulk of our approach. The covenants also address stabilization and erosion control placing this responsibility upon the owner/builders at the time of building construction.

Our final stormwater management plan shall be submitted to MDEQ and to the City of Bozeman at the time of submittal of the improvement plans for Phase 2. This plan shall address all elements of the plan in Phase 2 and Phase 3.

SOLID WASTE DISPOSAL

The City of Bozeman, Three Rivers Disposal and Customized Services can provide service to this development with disposal at the Bozeman Landfill.

ROADS

Public access to Bridger Creek Subdivision is provided by Bridger Canyon Road, Story Mill Road and McIlhattan Road. Access to the recently completed Phase 1 of Bridger Creek Subdivision is via Birdie Drive to Bridger Canyon Road and Boylen Road to Story Mill Road. Phase 2 and the majority of lots in Phase 3 access McIlhattan Road. Seven lots in Phase 3 shall access Story Mill Road, with two of the seven having direct access to Story Mill Road.

Phase 1 and the golf course caused Story Mill Road and that portion of McIlhattan Road from Story Mill Road to the clubhouse to be improved to a county standard paved road. In addition, Story Mill Road and portions of McIlhattan Road were constructed to a 27-foot wide paved surface to provide additional width for pedestrians and cyclists.

Table 5, Off-Site Transportation Improvements, summarizes the applicants improvement plans, timing, estimated costs and proposed sharing of costs. The discussion that follows Table 5, provides the background information, including an updated traffic analysis, that the applicant has relied upon to construct his schedule of transportation improvements.

TABLE 5
OFF-SITE TRANSPORTATION IMPROVEMENTS

PROJECT	TIMING	COST	RESPONSIBLE PARTY
McIlhattan Road: Overlay McIlhattan Road after watermain extension complete. (2050LF)	Phase 2	\$14,600.00	Applicant
Story Mill Road Bridge: Widen bridge 6.0-feet to the west; widen road to west and construct transitions to existing alignment north and south.	Phase 2	\$89,700.00	Cost shared equally by Applicant, City and County.
McIlhattan Road: Construct County Standard paved road to north boundary from end of pavement at clubhouse. (1730 LF)	Phase 3	\$74,400.00	Applicant
Story Mill Road: Grade surface of Story Mill Road from paved intersection of McIlhattan Road to north boundary of project. Add maximum 1" thick road mix. (1900 LF)	Phase 3	\$ 4,400.00	Applicant
Reconstruct Story Mill and McIlhattan Roads from Bridger Canyon Road to the Golf Course Clubhouse - Complete -	Phase 1	\$99,700.00	Completed by Applicant in 1995.

UPDATED TRAFFIC ANALYSIS

In April 1993, Morrison-Maierle, Inc. prepared a traffic study that analyzed the existing and future Levels of Service (LOS) on Story Mill Road and its intersection with Bridger Canyon Road. The prior study, prepared as a condition of Annexation, found Story Mill Road to be operating at a LOS A. With the build-out of Phase 1, Story Mill Road, can at times be expected to operate at a LOS B. The April 1993 study found that an improved Story Mill Road would operate at LOS C at full build-out of Phases 1, 2 and 3 and the golf course.

We will attempt to show via tabular form, that these conclusions are conservative and that the level of service on Story Mill Road will not drop below a LOS C. Our conclusions are based upon the fact that all three phases of Bridger Creek Subdivision will generate far less traffic than the April 1993 study projected and because the widening of the Story Mill Bridge will improve the carrying capacity of Story Mill Road. We should point out that although the bridge is being widened 6-feet, the roadway alignment will remain much the same. Constraints posed by the existing creek, lack of right-of-way and estimated cost of construction restrict the improvements to the bridge widening and required roadway transitions north and south of the bridge.

TABLE 6
STORY MILL ROAD LEVEL OF SERVICE

PHASE	ADT	PEAK HOUR (VPH)	RESERVE CAPACITY (VPH)	SERVICE LEVEL
Existing(4/93)	915	125	32	A
PHASE 1	970	222	102	B
PHASES 1-3	1754	300	24	B

The following discussion applies to Table 6:

1. Service flow rates for Story Mill Road were based upon rolling terrain with 80 percent of the road offering passing opportunities. Bridge widening was not taken into consideration. Rates are as follows:

LOS A	157
LOS B	324
LOS C	548
LOS D	810
LOS E	1568

Complete discussion and calculations are included within the 1993 Traffic Study.

2. Existing ADT from traffic counts dated November 1992. Peak hour was adjusted to reflect 15-minute peak period.
3. Peak Hour is taken as 10% of the ADT.
4. Reserve Capacity is the difference between Service Flow Rates and Peak Hour.
5. Phase 1 ADT reflects actual development which has resulted in a 11% decrease in projected ADT's.

Single Family:	54 units x 9 trips/unit	=	486
Multi Family:	86 units x 9 trips/unit	=	774
2.7 Ac x 4 units/Ac:	11 units x 9 trips/unit	=	99
Commercial:	(No Change)		<u>1321</u>
			2680 ADT

$$\begin{aligned}
 \text{Story Mill ADT} &= 25\% \text{ Phase 1 ADT} + 80\% \text{ Golf Course ADT} \\
 &= (0.25 \times 2680) + (0.80 \times 375) = 970 \text{ ADT} \\
 \text{Peak Hour} &= 10\% \text{ ADT} + \text{Existing Peak Hour} \\
 &= 97 + 125 = 222 \text{ vph}
 \end{aligned}$$

Note that the 25% factor for Phase 1 accounts for internal trips with destinations to local neighborhood commercial and accounts for traffic accessing Bridger Canyon Road via Birdie Drive.

6. Phase 2 and Phase 3 ADT's are reduced 40% and 67% respectively. ADT for Phases 2 and 3 arrived at by applying 9 trips per day to proposed number of units.

<u>Phase</u>	<u>1993 Study</u>	<u>1996 EA/CIS</u>
1	3012	2680
2	774	459
3	<u>1215</u>	<u>396</u>
Total	5000	3535

$$\begin{aligned}
 \text{Phase 1-3 ADT} &= 25\% \text{ Phase 1} + 80\% (\text{Ph 2} + \text{Ph 3} + \text{Golf Course}) \\
 &= (0.25 \times 2680) + (0.80(459 + 396 + 500)) \\
 &= 1754 \text{ vph} \\
 \text{Peak Hour} &= (0.10 \times 1754) + 125 = 300 \text{ vph}
 \end{aligned}$$

Summary of Traffic Analysis

- Bridger Creek Subdivision shall generate fewer trips than projected by the 1993 Traffic Study.
- Level of Service for Story Mill Road at full build-out will be at a B/C level.
- Level of Service for Bridger Canyon Road will remain at LOS C. (See 1993 Study)
- Story Mill Road/Bridger Canyon Road intersection shall function at LOS A/C as shown in 1993 Study.
- Phase 3 traffic impact to Story Mill Road north of McIlhattan Road will be the addition of 63 trips. (7 units x 9 trips/day/unit)

The applicant is attempting to expedite the discussion on the transportation system by compiling a list of needed improvements and their associated costs and assignment of those costs to the impacting party. TABLE 5 summarizes the subject improvements. The applicant has already expended nearly \$100,000 in making improvements to Story Mill and McIlhattan Roads and can expect to spend an additional \$123,000 through Phase 3 on off-site improvements. This amounts to an investment of over \$730/unit.

$$\begin{array}{rcl} \text{Phase 1-3} & = & 275 \text{ units} \\ \text{Commercial at 4 units/Ac: } 7.2 \times 4 & = & \frac{28 \text{ units}}{303 \text{ units}} \end{array}$$

$$(\$100,000 + \$123,000) \div 303 \text{ units} = \$730/\text{unit}$$

With respect to the widening of Story Mill Bridge, the applicant proposes that the cost be shared equally by the applicant, the City of Bozeman and Gallatin County. The justification for this proposed apportionment is:

1. Bridge deck is currently in need of repair. Project as proposed by the applicant would clean deck and place 6" topping. In addition cost estimate provides for the installation of shear connections to bring bridge up to "code", seismically. Gallatin County owns and maintains the bridge and would therefore incur these costs whether the bridge is widened or not. (\$13,400 with Engineering and contingency.)
2. The City of Bozeman's landfill as a destination currently generates as much as 25% of the traffic across Story Mill Road bridge, a large proportion of which are larger vehicles.

3. By constructing Phase 2 and 3, the applicant will add additional traffic to the bridge.

4. Each of the named entities generate traffic that uses Story Mill Road and the bridge. Sharing the cost of improving the bridge seems the simplest and best solution.

PHASE 2 - SINGLE ACCESS

As stated in the introduction we can provide a single access to Phase 2 but cannot feasibly provide a second access due to the constraints posed by construction within wetlands or across the existing golf course, both of which pose difficulties in maintaining vertical alignment with McIlhattan Road. We are requesting a waiver to Section 16.12.040.M of the Bozeman Area Subdivision Regulations to provide a second access due to physical constraints.

There exist several examples of similar single access loops within the City which have been constructed recently:

1. Graf's Second Subdivision: the Knaab-O'Connell-Lomas loop. Steep grades prevented the extension of O'Connell to Sourdough Road.
2. Museum of the Rockies parking lot. There is only one public entrance to this facility.

TYPICAL SECTIONS

City standard street sections with boulevard sidewalks are proposed for this development. The only exception to the standard roadway section will be that a spill gutter and a constant 2% cross slope from the inside gutter to the outside gutter shall be specified for the Augusta Drive loop. These measures are necessary in order to properly drain the landlocked interior lots .

UTILITIES

Copies of the preliminary plat were sent to the Montana Power Company, U.S. West Communications and TCI Cablevision in regards to providing electricity, gas, telephone and cable service to the Bridger Creek Subdivision, Phase 2 and 3. A copy of the letter from Montana Power Company is included in the appendix.

Montana Power will provided both electric and natural gas service to the subdivision. Individual services will be provided by underground services. Currently there are existing overhead facilities located within the development. Montana Power Company is working with the owners to mitigate any potential negative impacts. It is expected

that all other utilities will be able to provide service to this project. Montana Power has also indicated that the proposed easements are acceptable.

FENCING OF AGRICULTURAL LAND

This project will not disturb the fencing of any agricultural lands along the subdivision boundary.

EMERGENCY SERVICES

Due to the proximity of the site to the City of Bozeman, the response time of the fire, police, and ambulance services should all be within a few minutes. A trip to the nearest hospital, Bozeman Deaconess would be only 2.8 miles.

Emergency Medical

Emergency medical services will be provided by Medtrans of Montana Ambulance Service located on 2101 Industrial Drive immediately off of Griffin Drive. A letter soliciting their response to this project was sent to the ambulance service. As of this date no response has been received.

Fire Protection

Fire protection will be provided by the City of Bozeman. Water will be provided by the City of Bozeman water system via appropriately spaced hydrants throughout Bridger Creek Meadows. The nearest fire station is located at the intersection of Rouse and Mendenhall, a distance of 2.2 miles from the site. A letter soliciting comments from the fire department was sent. Their comments are included within the Appendix.

Police Protection

Gallatin County Sheriff's response letter dated December 19, 1995 states that they anticipate a gradual increase of calls for services. The City Police Department is 2.2 miles from the site.

In all probability, the existing organizations will be sufficient to meet the emergency service requirements of the proposed development. As a result of increased tax revenue generate by full development, additional equipment and personnel can be added to cope with increase loads.

SCHOOLS

Elementary and High School age children from Bridger Creek Subdivision, Phases 2 and 3 will attend the following schools in Bozeman:

Hawthorne Elementary School, 114 N. Rouse Ave.
Chief Joseph Middle School, 309 N. 11th
Bozeman Senior High School, 205 N. 11th

It is anticipated that many of the homes will be occupied by families with school age children, but at this point the number is unknown.

Assuming that there are 15 students per grade per 1,000 population one can estimate the number of students that would be generated:

$$15 \text{ students/grade} \times 13 \text{ grades} \div 1000 \text{ population} \\ = 0.195 \text{ students/population}$$

$$0.195 \text{ students/population} \times 95 \text{ dwelling units} \\ \times 2.6 \text{ people/dwelling unit} = 48 \text{ students}$$

A letter was sent to Bozeman Public School District asking for comments on the proposed development. Our letter and their response is included within the Appendix.

LAND USE

Bridger Creek Subdivision and the lands comprising the golf course have been annexed and zoned appropriately for the proposed development. The golf course retained its AS (Agricultural-Suburban) zoning with the balance of the development being zoned as follows:

Phase 1: R1, R3, M1 and B1
Phase 2: R3
Phase 3: R3

Planning for Bridger Creek Subdivision began in 1985. Ten years later the end is in sight. Phases 2 and 3 will complete the residential development. Planning for the residential development and golf course called for a blending of the two uses.

No public lands are impacted by this project. With the exception of the Bozeman Landfill on the north border of Phase 3, this development does not adversely impact adjacent land uses. Other than the adjacent landfill there are no hazards or nuisances associated with any on-site or off-site activities.

Phase 3 dedicates a 100-foot wide parkland buffer for distance of over 1250 feet along the easterly half of the north boundary of Phase 3. This 100-foot strip begins at a point on the west where the local topography screens much of the landfill from Phase 3. A 30-foot trail corridor is proposed for the westerly half of the north boundary. This corridor runs the length of the new landfill cell which is generally not visible from Phase 3.

The applicant believes that the combination of a 30-foot buffer and 100-foot buffer provides adequate separation between the residential uses and the landfill and also provides a location for others to construct a connecting trail from McIlhattan Road to Story Mill Road. We have provided the greatest separation in the vicinity of the existing cell realizing the necessity of this action, but we do not believe it should fall upon the applicants' shoulder to provide the same buffer adjacent to the newly constructed cell. If the City of Bozeman and staff believe that this is important, then we suggest that the buffer should have been part of the expansion of the landfill. A 100-foot or 150-foot buffer together with a landscape screen on City property would seem appropriate.

If a uniform 100 or 150-foot buffer, as proposed by staff, is indeed required as a condition of preliminary plat, then the applicant will view this as a taking of land. We realize the necessity of some buffering, but do not consider it appropriate to place this burden upon the applicant to provide the entire buffer.

In defense of this position, we are compelled to state the following:

1. The landfill is scheduled to be closed in 7 to 15 years according to various estimates. At this future point in time the necessity for a buffer largely goes away, unless of course the City is caught up in performing remedial measures designed to mitigate adverse environmental impacts.
2. The landfill wasn't necessarily "there first." Granted, the existing landfill has been there for many years, but it does not predate the surrounding agricultural lands. And the new cell was recently designed and constructed with the full knowledge that just yonder across the south fence there existed a 35 acre parcel that was annexed and rezoned R-3. We are talking residential development! The buffer for this new cell should lie upon City property. Along the older portion of the landfill the applicant has taken the good neighbor position and provided ample separation. We are requesting that the City of Bozeman provides the same along the new cell.

HOUSING

The proposed subdivision would create 91 single family lots and one condominium lot

with the potential for four units. Therefore a total of 92 lots equal to 95 living units will be constructed in two phases over a 3 or 4 year span.

The added population resulting from the proposed change in use from vacant R3 will vary depending upon occupancy. It is expected that most of the living units will be permanent residences with some retirement and vacation homes. At 3.2 persons per living unit one can expect a maximum of 304 residents. For comparison, Gallatin County's average occupancy rate is closer to 2.6 persons per living unit; a development comprised of equal numbers of permanent and retirement or vacation homes would generate closer to 2 persons per living unit. It follows that a range of 190 to 300 persons could reside at the subject development.

PARKS

This project exceeds the park dedication requirement of 0.03 acres per dwelling unit as described in 76-3-621 (2). Parkland dedication as delineated adjacent to the Bozeman Landfill, totals 4.80 acres. The applicant is also setting aside an additional 1.70 acre private park within Phase 2. The total acreage required for both phases is 2.85 acres (95 dwelling units x 0.03 ac/du = 2.85 ac.) Using the 'one-ninth' rule this development would have required the following dedication:

$$\begin{array}{rcl} \text{Phase 2: } & 15.04 \text{ Ac} \times 1/9 & = 1.67 \text{ Ac} \\ \text{Phase 3: } & 25.74 \text{ Ac} \times 1/9 & = \underline{2.86 \text{ Ac}} \\ \text{Total} & & = 4.53 \text{ Ac} \end{array}$$

The primary park dedication by the applicant is in Phase 3. It consists of a 100-foot wide buffer and 30-foot wide trail corridor adjacent to the landfill together with a 190-foot wide corridor connecting to the golf course. The trail corridor and "buffer" provide a trail corridor linking McIlhatten Road and Story Mill Road. The total acreage dedication is 4.80 acres, to be reserved in a nonrevocable easement to the City. When the plat for Phase 3 is filed the easement shall disappear being replaced by a fee simple dedication. We would conclude that the area being offered for dedication meets or exceeds the standards and requirements for parkland dedication. Our conclusion is drawn from the following observations:

1. Acreage being offered for dedication exceeds that required by the "one-ninth rule" and the new MCA Section 76-3-621 (2) equal to 0.03 acres per dwelling unit.

Comparison:

Offered:	4.80 ac
"One-ninth" rule:	4.53 ac
MCA 76-3-621 (2):	2.85 ac

2. The area being offered for parkland, while not expressly suitable for a public park, serves as a strategic buffer between the landfill and future residential units. Inasmuch as the City has not provided for any land upon their own property to screen the landfill's operations, it has fallen upon the applicant to provide this buffer. We are prepared to provide a 100-foot buffer between that portion of the landfill that was in operation at the time that annexation and rezone proceedings were concluded for the parcel now known as Phase 3. (City Commission Actions: Annexation = October 26, 1992; Zone Map Amendment = December 21, 1992) Any additional lands would compromise the economic feasibility of the project which has been in the planning stages for over 3 years. We offer that all additional buffering should occur upon City property and not upon the applicant's.

3. Parkland dedication provides essential trail corridor from McIlhattan Road to Story Mill Road.

4. As discussed earlier in this report, Phases 1, 2 and 3 have been designed around an 18-hole golf course which provides the following amenities to the subdivision and community:

- Public golf course;
- Access to Bridger Creek and the East Gallatin River, both excellent fisheries;
- Trail through Phase 1 from a point adjacent to properties on Story Mill Road to the East Gallatin Recreation area;
- Potential for nordic ski touring opportunities;
- Preservation of stream corridors, riparian habitats, wetlands and open space.

In summary, this development has meritoriously provided excellent golfing opportunities, preserved valuable habitats, furnished trail corridor segments and planned for a buffer between the operational landfill and residential areas and provided for parkland dedications exceeding that required in MCA 76-3-621 subsections (2), (4) and (6).

TAXATION

The current vacant R3 properties, medium density residential lands totaling approximately 60 acres generate at present an estimated \$850.00 in property taxes. As developed residential property, assuming a value of \$150,000 per living unit/lot the project would generate the following tax revenue:

$$95 \text{ living units} \times \$150,000/\text{unit} \times 3.86\% \times 0.35782 \text{ mils} = \$207,180$$

This additional tax base does not address impact fees or future SID's information.

FENCES

This project does not propose to remove, relocate or other wise affect agricultural fencing on any lands adjacent to its boundaries.

FLOOD HAZARD EVALUATION

Approximately 50 acres of the 287 acre tract described in COS 1353 are within the adopted floodplains for Bridger Creek and the East Gallatin River. A composite of FIRM panels 300028-5C and 8C showing the floodplain, is included within the Appendix. This composite view depicts Phase 2 and Phase 3 and a portion of Phase 1. Flood prone areas include not only the expected locations adjacent to the streams, but also shallow overland flooding resulting from upstream over-flows which is the only type of flooding that might threaten Lot 32 within Phase 2. No portion of Phase 3 is subject to flooding.

Flood flow information obtained from the Flood Insurance Study report is summarized below.

FLOOD INSURANCE STUDY

Location	Drainage Area (Square Miles)	Peak Discharge (Cubic feet/sec.)		
		10-year	50-year	100 year
East Gallatin at Gallatin Drive	95.6	1100	1590	1810
Bridger Creek at confluence with Gallatin	70.3	790	1170	1350

The location and extent of potential flooding identified by the FIRM studies was used as one of the prime design factors in laying out the golf course, road alignments and residences. The flood plain and adjacent areas are obvious choices for location of the golf course for the following reasons:

1. Minimal disruption of the flood plain.

2. Buffer can be provided between the streams and residential sites which would be substantially greater than the 35 foot minimum setback.
3. Riparian zones and vegetation are preserved by open space.
4. Landscaping required to beautify the fairways is reduced.

We have reviewed the limits of the AE-Zone and X-Zone and the cross sections compiled by the study and generally agree with the boundaries as shown. Because the area bounded by Zone X tends to be rather narrow, averaging less than 30' in width, we chose to ignore any distinction between the AE and X Zones. Rather we have treated them both as 100-yr. floodplains and inserted the limits of the Zone X boundary into the drawing database or in its absence, we have relied upon the boundary of Zone AE to show the floodplain. In this manner, we have attempted to follow the most comprehensive and conservative approach to defining the floodplain limits.

With respect to Lot 32, Phase 2, most if not all of this lot might be excluded from the 100 year floodplain if we were to show a distinction between Zone X and Zone AE. If the inclusion of Lot 32 within Phase 2 presents an approval "problem" we shall attempt to refine our delineation of the limits of Zones X and AE.

It is our proposal to fill a portion of Lot 32 to a point above the 4698 elevation raising it above the floodplain as defined by the cross section immediately upstream. The road shall require some embankment in order to match McIlhattan Road without exceeding maximum centerline grades, also raising it above the 100-year floodplain as defined by the study's cross sectional data. Again, we want to emphasize that we have let the boundary of the X-Zone defines the floodplain limits preferring this conservative approach to that of using only the AE-Zone limits.

H:\2089\006\EA\EAREV
January 11, 1996

APPENDIX

BOZEMAN REFUSE DISTRICT
CITY OF BOZEMAN
P.O. BOX 640

LAWRENCE D. & NANCY McILHATTAN
BOX 5240, ROUTE 3R
LYNINGSTON, MT. 59047

HALLIE B. RUGHEIMER
TRACT 3
1400 STORY MILL ROAD
BOZEMAN, MT. 59715

PHASE 3

GOLF COURSE PARTNERS INC.
REX EASTON
9315 COUGAR DRIVE
BOZEMAN, MT. 59715

PHASE 2

GOLF COURSE PARTNERS INC.
REX EASTON
9315 COUGAR DRIVE
BOZEMAN, MT. 59715

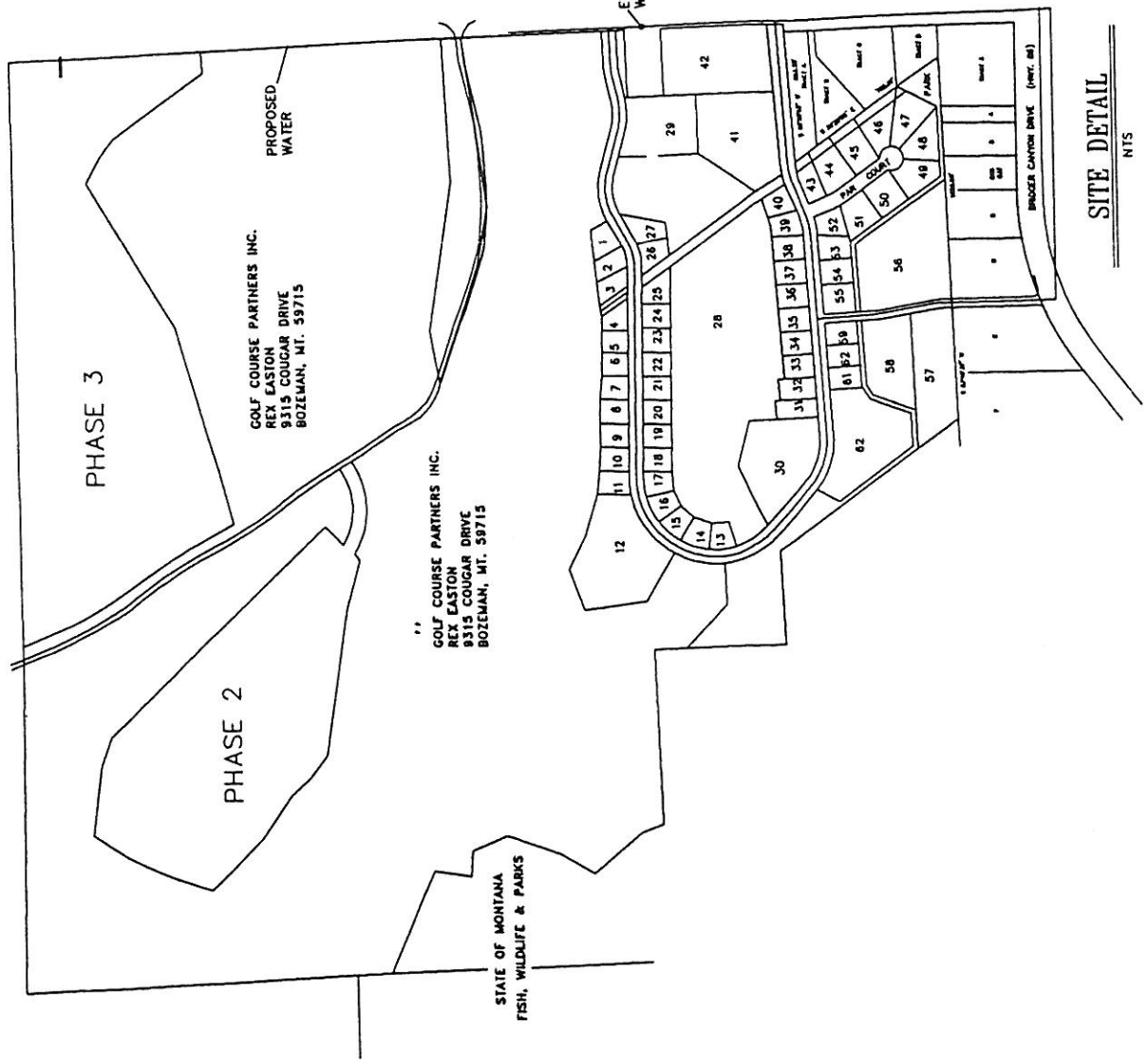
ROGER KIRK
P.O. BOX 6165
BOZEMAN, MT. 59715

LISA MARIE WILLIAMS
960 MANLEY RD.
BOZEMAN, MT. 59715

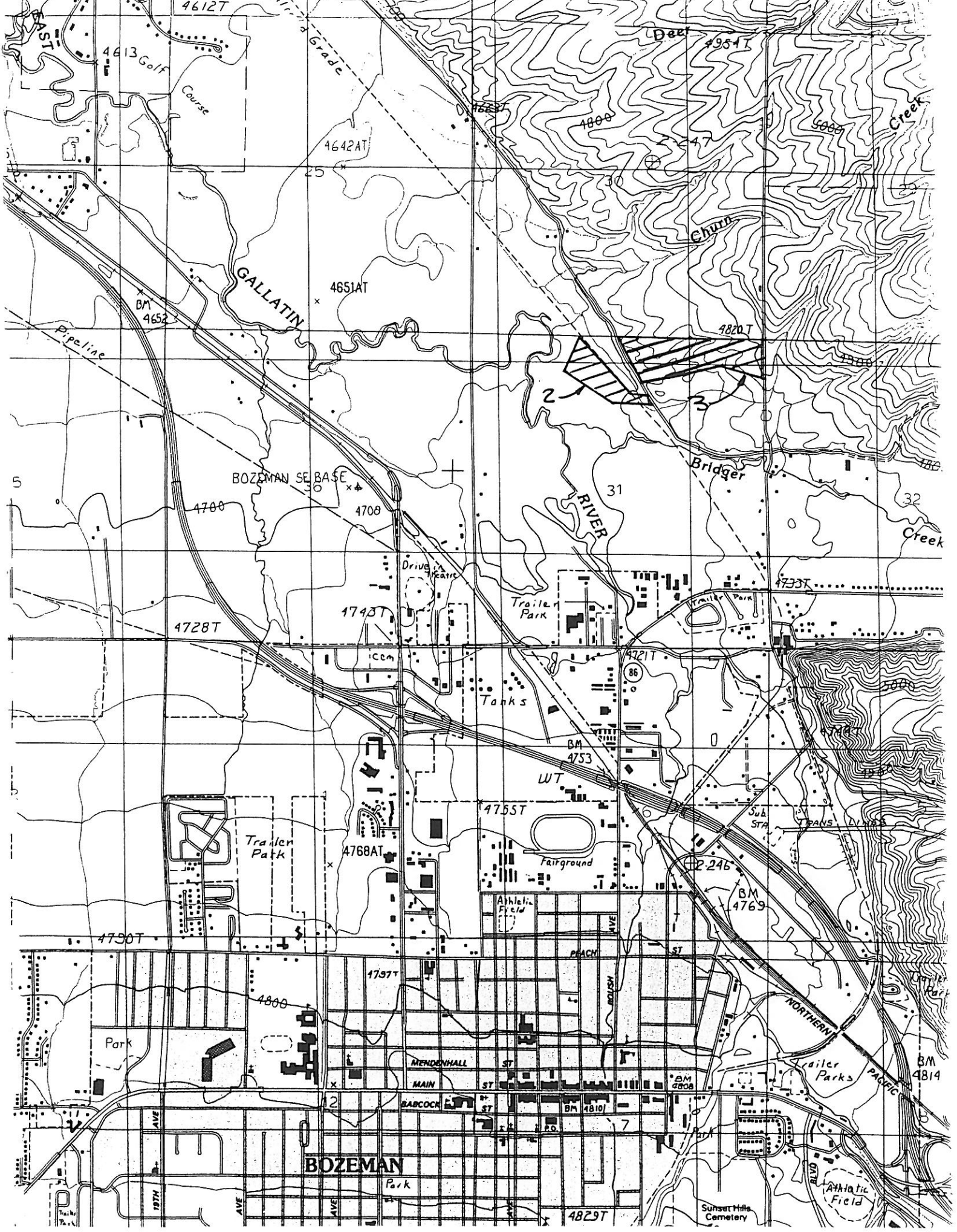
STATE OF MONTANA
FISH, WILDLIFE & PARKS

EXISTING WATER

PROPOSED WATER



SITE DETAIL
NTS



Story Mill Road

Phase 3

McIlhattan Road

Phase 2



SCS

(509 B)
Enbar Series

Depth class: #very deep

Drainage class: somewhat poorly drained

Permeability: moderate

Landform: bottomlands adjacent to creeks

Parent material: alluvium

Slope range: 0 to 4 percent

Elevation range: 4300 to 4900 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 43 degrees F

Frost free period: 90 to 110 days

Taxonomic Class: Fine-loamy, mixed Cumulic Haploboroll

Typical Pedon Enbar loam, in woodland (colors are for moist soil unless otherwise noted).

A1=0 to 12 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry. Strong very fine and fine subangular blocky structure; hard, firm, sticky and plastic; many very fine, fine, medium and coarse roots; neutral (pH 7.0); clear smooth boundary.

A2=12 to 22 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; few fine prominent yellowish red (5YR 5/8) mottles; moderate fine subangular blocky structure; hard, firm, sticky and plastic; common very fine, fine and medium roots; neutral (pH 7.2); clear smooth boundary.

Bg1=22 to 37 inches; dark gray (10R 4/1) sandy loam, grayish brown (10YR 5/2) dry; common fine prominent strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; mildly alkaline (pH 7.4); gradual smooth boundary.

Bg2=37 to 49 inches; gray (10YR 5/1) sandy loam, light brownish gray (10YR 6/2) dry; many fine prominent strong brown (7.5YR 4/6) mottles; massive; hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; mildly alkaline (pH 7.4); clear smooth boundary.

2C=49 to 60 inches; gray (10YR 5/1) very gravelly loamy sand, light gray (10YR 6/1) dry; few fine prominent brownish yellow (10YR 6/6) mottles; single grain; loose, nonsticky and nonplastic; 45 percent pebbles and 5 percent cobbles; mildly alkaline (pH 7.8).

TYPE LOCATION: Gallatin County, Montana; 1000 feet north and 1700 feet east of the SW corner of sec. 1, T.1N., R.8E.

Range in Characteristics

Control section: 10 to 40 inches
Soil temperature: 41 to 45 degrees F.
Moisture control section: 4 to 12 inches
Mollic epipedon thickness: 16 to 28 inches
Content of clay in the control section: 18 to 30 percent
Rock fragments in the control section: 0 to 15 percent
Depth to water table: 36 to 72 inches
Depth to 2C horizon: 40 to 60 inches
Soil phases: moist

A horizon:

Hue=

Value= moist; dry

Chroma=

Texture (less than 2mm)=loam, silt loam

Clay content=18 to 27 percent

Content of rock fragments=0 to 15 percent (0 to 5 percent cobbles; 0 to 10 percent pebbles)

Reaction=pH 6.6 to 7.8

Bg horizons:

Hue=

Value= moist; dry

Chroma=

Texture (less than 2mm)=loam, sandy loam, silt loam, silty clay loam

Clay content=18 to 30 percent

Content of rock fragments=0 to 15 percent (0 to 10 percent pebbles)

Reaction=pH 7.4 to 8.4

Notes=The lower part of the Bg horizons may have less than 18 percent clay in some pedons.

2C horizon:

Hue=

Value= moist; dry

Chroma=

Texture (less than 2mm)=loamy sand, sandy loam

Clay content=5 to 18 percent

Content of rock fragments=35 to 75 percent (0 to 5 percent cobbles; 35 to 70 percent pebbles)

WATER FEATURES
 consultants

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
64B: Straw-----	B	None	---	---	>6.0	---	---	---	---
407A: Sudworth-----	B	Rare	---	---	4.0-8.0	Apparent	Apr-Jun	---	---
Nesda-----	B	Rare	---	---	4.0-8.0	Apparent	Apr-Jun	---	---
450C: Blackdog-----	B	None	---	---	>6.0	---	---	---	---
Quagie-----	B	None	---	---	>6.0	---	---	---	---
450D: Blackdog-----	B	None	---	---	>6.0	---	---	---	---
Brodyk-----	B	None	---	---	>6.0	---	---	---	---
509B: Enbar-----	B	Rare	Brief	JAN-JUL	2.5-5.0	Apparent	Apr-Jul	---	---
522A: Enbar-----	B	Rare	Brief	JAN-JUL	2.5-5.0	Apparent	Apr-Jul	---	---
537A: Lamoose-----	D	None	---	---	1.0-2.0	Apparent	Apr-Jul	---	---
542A: Blossburg-----	C	None	---	---	1.0-2.0	Apparent	Apr-Jul	---	---
556A: Threefork-----	D	Rare	---	---	0.0-1.0	Apparent	Apr-Jun	---	---
Bonebasin-----	D	Rare	---	---	0.0-1.0	Apparent	Jan-Dec	---	---
606A: Bandy-----	C	Occasional	Brief	JAN-JUN	1.0-2.0	Apparent	May-Jun	---	---
Riverwash-----	D	Frequent	---	OCT-JUL	0.0-2.0	Apparent	Jan-Dec	---	---

WATER FEATURES--Continued
 consultants

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
Bonebasin-----	D	Occasional	Brief	APR-JUN	0.0-1.0	Apparent	Jan-Dec	---	---

WATER FEATURES

Endnote -- WATER FEATURES

This report gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms. The four hydrologic soil groups are:

Group "A". Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group "B". Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group "C". Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group "D". Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table; soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in this report, the first letter is for drained areas and the second is for undrained areas. Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes. This report gives the frequency and duration of flooding and the time of year when flooding is most likely. Frequency, duration, and probable dates of occurrence are estimated.

Frequency is expressed as "None", "Rare", "Occasional", and "Frequent". "None" means that flooding is not probable; "Rare" that it is unlikely but possible under unusual weather conditions; "Occasional" that it occurs, on the average, once or less in 2 years; and "Frequent" that it occurs, on the average, more than once in 2 years.

Duration is expressed as "Very brief" if less than 2 days, "Brief" if 2 to 7 days, "Long" if 7 to 30 days, and "Very long" if more than 30 days. The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding. Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods.

WATER FEATURES

Endnote -- WATER FEATURES--Continued

Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in this report are the depth to the seasonal high water table; the kind of water table, that is, "Apparent", "Artesian", or "Perched"; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in this report.

An "Apparent" water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

An "Artesian" water table exists under a hydrostatic beneath an impermeable layer. When the impermeable layer has been penetrated by a cased borehole, the water rises. The final level of the water in the cased borehole is characterized as an artesian water table.

A "Perched" water table is water standing above an unsaturated zone. In places an upper, or "Perched", water table is separated from a lower one by a dry zone. Only saturated zones within a depth of about 6 feet are indicated.

Ponding is standing water in a closed depression. The water is removed only by deep percolation, transpiration, evaporation, or a combination of these processes.

This report gives the depth and duration of ponding and the time of year when ponding is most likely. Depth, duration, and probable dates of occurrence are estimated.

Depth is expressed as the depth of ponded water in feet above the soil surface. Duration is expressed as "Very brief" if less than 2 days, "Brief" if 2 to 7 days, "Long" if 7 to 30 days, and "Very long" if more than 30 days. The information is based on the relation of each soil on the landscape to historic ponding and on local information about the extent and levels of ponding.

BUILDING SITE DEVELOPMENT
consultants

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
64B: Straw-----	Slight	Slight	Slight	Slight	Moderate: low strength, frost action	Slight
407A: Sudworth-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Moderate: large stones
Nesda-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding	Moderate: droughty
450C: Blackdog-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Slight
Quagle-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
450D: Blackdog-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: low strength, slope, frost action	Moderate: slope
Brodyk-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
509B: Enbar-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: frost action	Slight

BUILDING SITE DEVELOPMENT--Continued
consultants

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
522A: Enbar-----	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: frost action	Slight
537A: Lamoose-----	Severe: cutbanks cave, wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness, frost action	Severe: wetness
542A: Blossburg-----	Severe: cutbanks cave, wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action	Moderate: large stones, wetness
556A: Threefork-----	Severe: cutbanks cave, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: wetness, frost action	Severe: wetness
Bonebasin-----	Severe: cutbanks cave, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: wetness, frost action	Severe: wetness
606A: Bandy-----	Severe: cutbanks cave, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding	Moderate: large stones, wetness, droughty
Riverwash-----	Severe: cutbanks cave, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: wetness, flooding	Severe: small stones, wetness, droughty

BUILDING SITE DEVELOPMENT--Continued
 consultants

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Bonebasin-----	Severe: cutbanks cave, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: flooding, wetness	Severe: wetness, flooding, frost action	Severe: wetness

BUILDING SITE DEVELOPMENT

Endnote -- BUILDING SITE DEVELOPMENT

This report shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are "Slight", "Moderate", or "Severe". The limitations are considered "Slight" if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; "Moderate" if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and "Severe" if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

SHALLOW EXCAVATIONS are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or bands to sloughing or caving is affected by soil texture and the depth to the water table.

DWELLINGS AND SMALL COMMERCIAL BUILDINGS are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

LOCAL ROADS AND STREETS have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

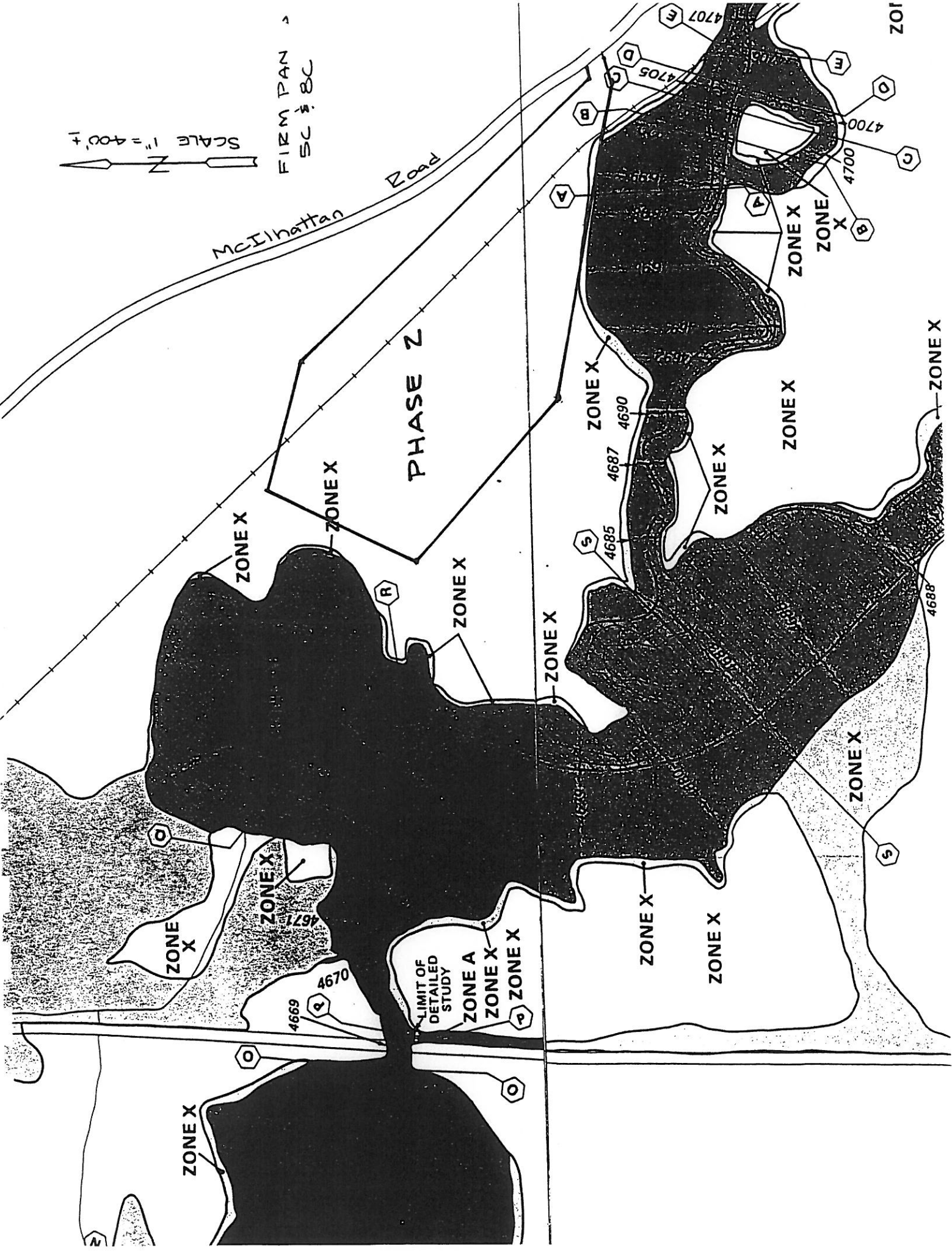
LAWNS AND LANDSCAPING require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

SCALE 1" = 400'

FIRM PAN
SC 8C

McIlhattan Road

PHASE Z





Schafer & Associates, Inc.

(406) 587-3478

FAX (406) 587-0331

865 Technology Blvd.

P.O. Box 6186

Bozeman, MT 59715

January 9, 1996

Morrison Maierle, Inc.
Attn: Mr. Keith Belden
P.O. Box 1113
Bozeman, MT 59715

Dear Mr. Beldon:

This letter is in response to your concerns regarding the necessity of the Corps of Engineers (COE) to be involved with Phases II and III of the Bridger Creek Subdivision, particularly as it pertains to stormwater runoff and Section 404 of The Clean Water Act.

After our site visit I phoned Ms. Roxanne Lincoln of the State Water Quality Division regarding the COE involvement with the NPDES process. She confirmed that their involvement is not necessary since no dredging or filling of wetlands would occur. She also informed me that a courtesy letter to the COE informing their agency of your NPDES intentions would be appreciated but not necessary.

I also spoke with COE Agent Doug McDonald in Helena, MT yesterday to confirm this information. He concurred with Ms. Lincoln that the COE does not have 404 jurisdiction over the matter. He is willing to write a letter to that effect, if necessary, for documentation. Please let me know if I can be of further assistance.

Sincerely,

Donna S. Lovell
Wetlands Project Manager

Ref: u:\193\let\nocoe.let

STORMWATER

PRELIMINARY
STORMWATER CALCULATIONS
§
DESIGN

DATA:

TRIBUTARY AREAS:

DESCRIPTION	"C"	AREA	
		PHASE 2	PHASE 3
LOTS	0.50	15.04	25.74
ROADS	0.95	4.46	4.43
PARK	0.25	0.43	—
OPENSOURCE	0.25	1.70	4.80
TOTAL	—	21.63	34.97
AVERAGE "C"	—	0.57	0.52

GOLF COURSE 0.25 7.0 29.2 @ 0.25 // 2.3 @ 0.95
 ↓
 (TRIBUTARY TO PRIMARY DETENTION AREA)
 0.25 8.0 —
 (TRIBUTARY TO SECONDARY DETENTION AREA)

PLAN:

- 1) USE 10-YR STORM EVENT
- 2) SIZE REQUIRED DETENTION AREAS
- 3) LOOK AT SUB-AREAS IN PHASE 2 & QUANTIFY RUNOFF THROUGH CURB OPENINGS
- 4) SIZE PHASE 3 DRIVEWAY CULVERTS

PREDEVELOPMENT RUNOFF:

$$A = 21.6 + 35.0 + 7.0 + 29.2 + 2.3 + 8.0 = 103.1 \text{ AC}$$

$$C = 0.25$$

$$t_c = (640 + 1600 + 1300) \text{ LF OVERLAND FLOW @ } 0.75 \text{ FPS} = 80 \text{ min}$$

(USE 0.75 FPS AS AVERAGE RUNOFF VELOCITY FOR SLOPES RANGING FROM 1% TO 16%.)

$$L_{10} = 0.64 (80/60)^{-0.65} = 0.53$$

$$Q = C \cdot L \cdot A = (0.25)(103.1)(0.53) = 13.7 \text{ cfs}$$

USE 13.7 cfs AS ALLOWABLE RELEASE RATE WHEN SIZING DETENTION AREA

POSTDEVELOPMENT RUNOFF:

TIME OF CONCENTRATION: PREDEVELOPMENT PATH STILL CONTROLS; $t_c = 80 \text{ min}$

C & A FROM DATA

FIND AVG C FOR ALL AREAS:

$$\frac{(21.6 \times 0.57) + (35.0 \times 0.52) + ([7+8] \times 0.25) + (2.3 \times 0.95)}{103.1}$$

$$C_{\text{AVG}} = 0.35 ; A = 103.1$$

USE MODIFIED RATIONAL METHOD TO SIZE DETENTION AREAS.

$(t_c = 80)$

DURATION (MIN)	INTENSITY (IN/HR)	Q (CFS)	VOLUME (CF)	REMARKS
10	2.05	9.25	<17,400>	
30	1.00	13.59	<330>	
60	0.64	17.32	7070	
70	0.58	18.28	7570	
75	0.55	18.73	7582	← CONTROLS
80 (= t_c)	0.53	19.16	7460	t_c
90	0.49	17.74	6849	

VOLUME TOO LOW! LOOK AT DIFFERENT
TIME OF CONCENTRATION, SELECT
PATH THROUGH PHASE 3. : $t_c = 41$ MIN

DURATION (MIN)	INTENSITY (IN/HR)	Q (CFS)	VOLUME (CF)	REMARKS
10	2.05	18.05	8723	
30	1.00	26.52	19609	
35	0.91	27.99	20457	
41 (= t_c)	0.82	29.58	20971	← CONTROLS
45	0.77	27.84	21067	
50	0.72	26.00	20956	

21067 CF REQUIRED

PRIMARY DETENTION AREA CONSISTS OF A
2.1 ACRE AREA CAPABLE OF RETAINING
1.05 AC.FT = 45700 CF OF WATER. AREA
IS IN QUAKING ASPENS ADJACENT TO THE
GREEN ON HOLE NO. 14.

SECONDARY DETENTION AREA IS PORTION OF OLD RIVER CHANNEL WITH A VOLUME OF 15000 CF (= 250' x 60' x 1' deep).

TOTAL AVAILABLE VOLUME IS IN EXCESS OF 60000 CF (= 1.4 AC.FT), NEARLY 3 TIMES THE REQUIRED VOLUME. ADDITIONAL STORAGE VOLUME EXISTS IN THE THREE PONDS WHICH WILL DOUBLE AS STORMWATER TREATMENT CELLS.

PHASE 2: MAXIMUM CURB OPENING RUNOFF

ASSUME THE FOLLOWING:

$$t_c = \begin{array}{l} 120 \text{ LF OVERLAND FLOW @ } 0.5 \text{ FPS} = 4.0 \text{ MIN} \\ 650 \text{ LF GUTTER FLOW @ } 1.0 \text{ FPS} = \underline{10.8} \\ 14.8 \text{ MIN} \end{array}$$

$$C = 0.57$$

$$L_{10} = 1.59$$

$$Q = (0.57)(1.59)(8.0) = 7.25 \text{ CFS}$$

$$28" \text{ WIDE CHASE ; } S = 2.5\% ; n = 0.015 ; Q = 7.76 \text{ CFS}$$

$$36" \text{ WIDE CHASE ; } S = 1.5\% ; n = 0.015 ; Q = 8.08 \text{ CFS}$$

PHASE 3 DRIVEWAY CULVERTS

CHECK MCILHATTAN ROAD CULVERT

$$\begin{aligned}
 t_c &= 1180' \text{ OVERLAND FLOW @ } 1 \text{ FPS} = 1180 \text{ SEC} \\
 & \quad 550' \text{ GUTTER FLOW @ } .0.5 \text{ FPS} = \frac{275 \text{ SEC}}{24.3 \text{ MIN}}
 \end{aligned}$$

$$C = 0.52$$

$$A = 11.0 \text{ AC } \pm$$

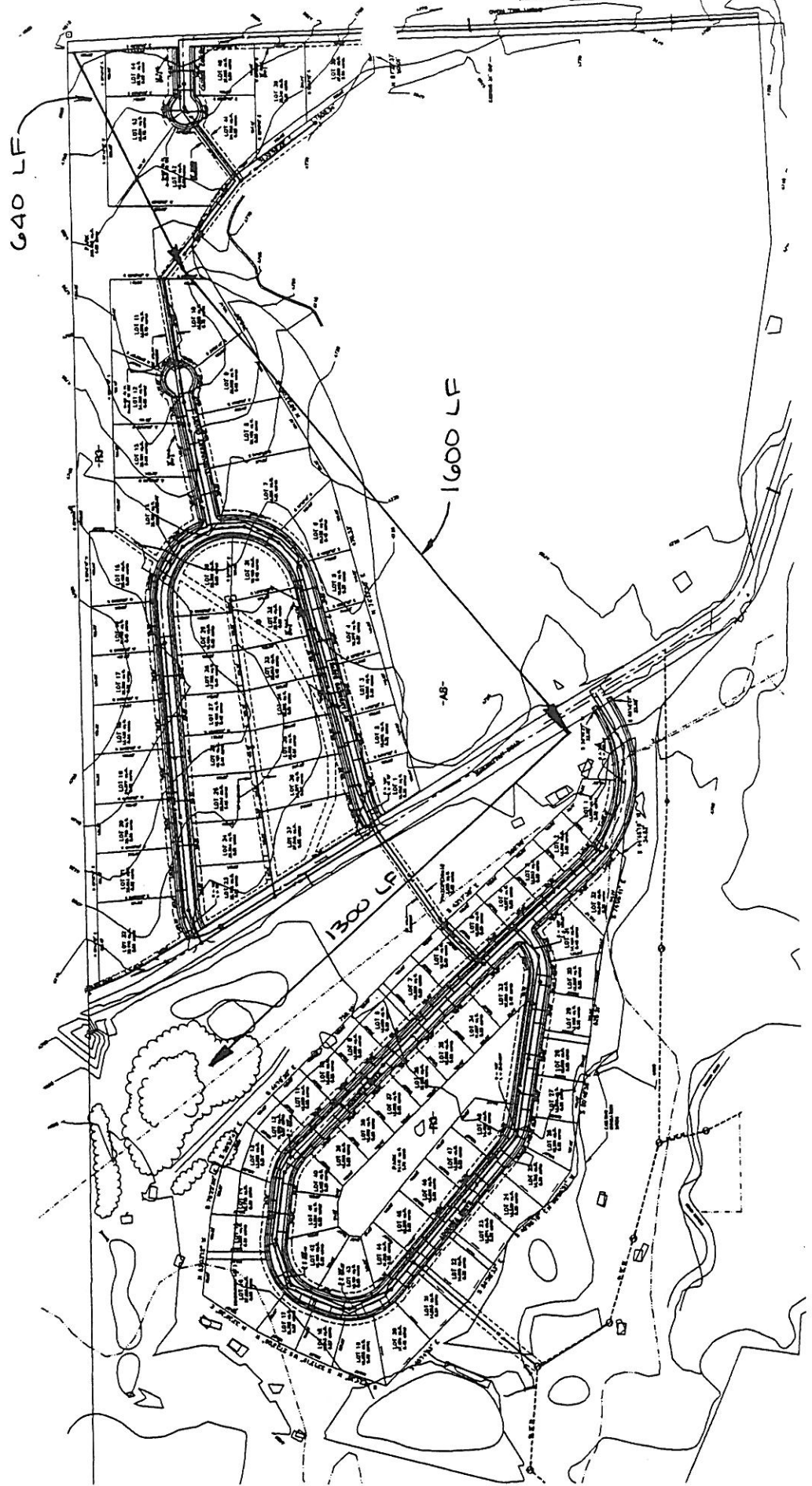
$$L_{10} = 0.64 (24.3/60)^{-0.65} = 1.15$$

$$Q = (0.52) (1.15) (11.0) = 6.58 \text{ CFS}$$

USE MANNINGS EQUATION TO GREAT RATING TABLE. SEE ATTACHED CALCULATIONS.

Ø	SLOPE
21"	1%
18"	1.5%
18"	2.0%
15"	2.5%

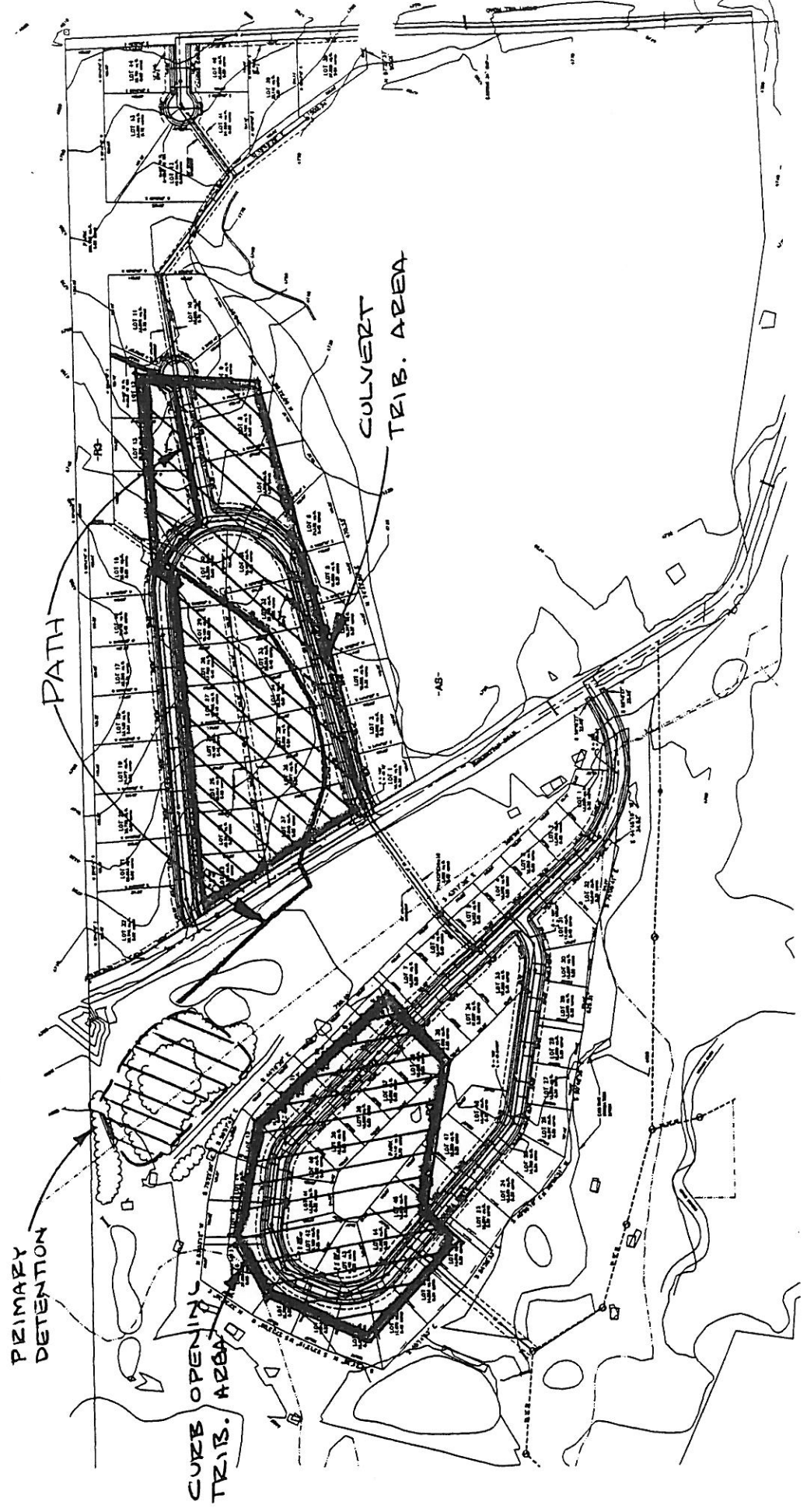
PREDEVELOPMENT PATH



POSTDEVELOPMENT PATH & T_c

OVERLAND FLOW @ 1 FPS: 1180' : 1180 SEC
 OVERLAND FLOW @ 0.5 FPS: 500' : 1000 SEC
 GUTTER FLOW @ 2.0 FPS: 550' : 275 SEC
 2230' : 2455 SEC = 41 MIN

SCALE 1" = 400'



Rectangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: BRIDGER CK PH2

Comment: CURB CHASE CALCULATIONS

Solve For Discharge

Given Input Data:

Bottom Width.....	2.33 ft
Manning's n.....	0.015
Channel Slope....	0.0250 ft/ft
Depth.....	0.45 ft

Computed Results:

Discharge.....	7.76 cfs
Velocity.....	7.40 fps
Flow Area.....	1.05 sf
Flow Top Width..	2.33 ft
Wetted Perimeter.	3.23 ft
Critical Depth...	0.70 ft
Critical Slope...	0.0069 ft/ft
Froude Number....	1.94 (flow is Supercritical)

Rectangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: BRIDGER CK PH2

Comment: CURB CHASE CALCULATIONS

Solve For Discharge

Given Input Data:

Bottom Width.....	3.00 ft
Manning's n.....	0.015
Channel Slope....	0.0150 ft/ft
Depth.....	0.45 ft

Computed Results:

Discharge.....	8.08 cfs
Velocity.....	5.98 fps
Flow Area.....	1.35 sf
Flow Top Width...	3.00 ft
Wetted Perimeter.	3.90 ft
Critical Depth...	0.61 ft
Critical Slope...	0.0061 ft/ft
Froude Number....	1.57 (flow is Supercritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: a:\2089

Description: BRIDGER CK PH3 CULVERTS

Solve For Actual Depth

Given Constant Data;

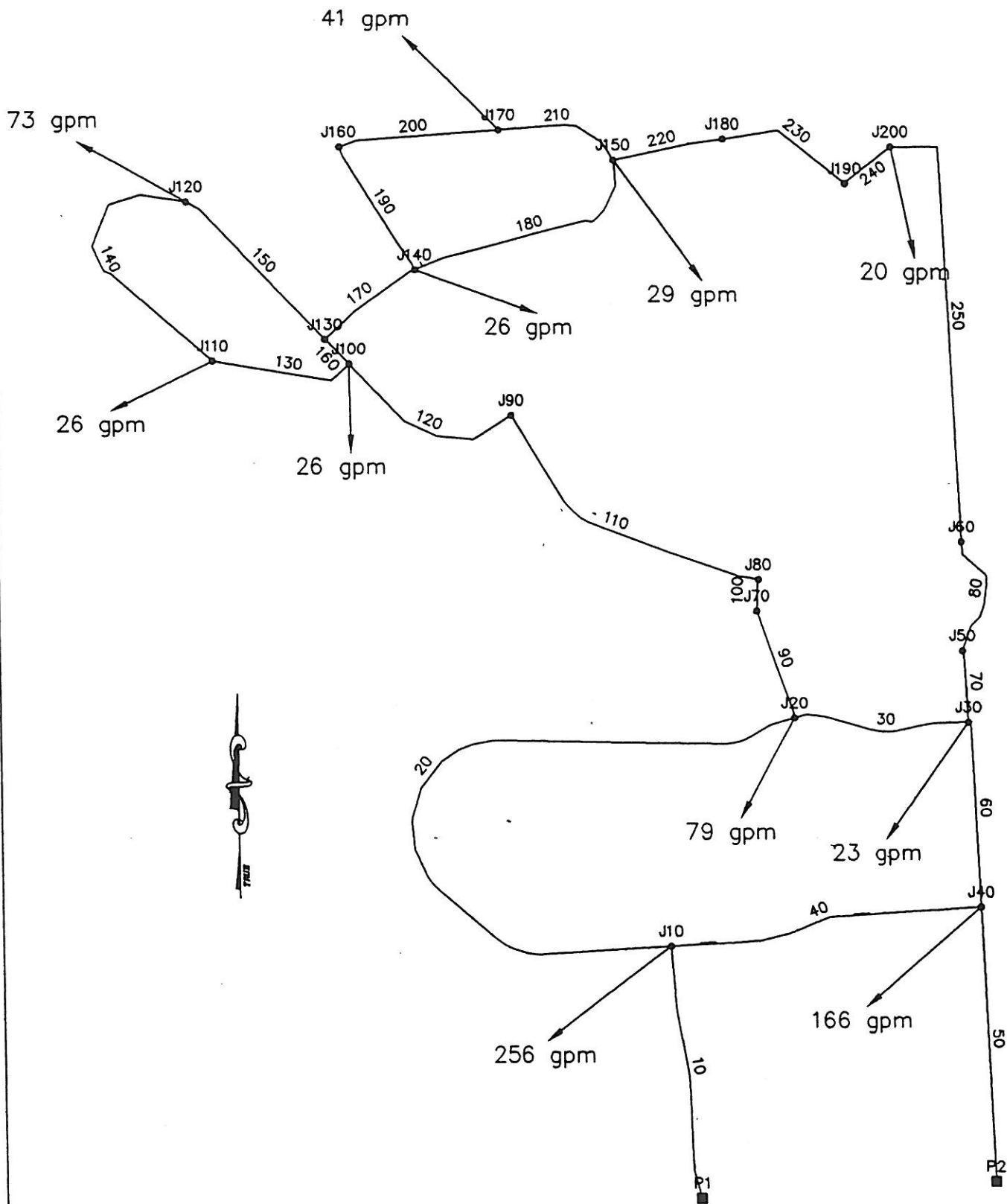
Mannings n..... 0.015
Discharge..... 6.58

Variable Input Data :=====	Minimum =====	Maximum =====	Increment By =====
Diameter	1.25	2.00	0.25
Slope	0.0100	0.0600	0.0050

VARIABLE VARIABLE		COMPUTED COMPUTED COMPUTED				
=====		=====				
Diameter	Channel	Mannings	Discharge	Depth	Velocity	Capacity
ft	Slope	'n'	cfs	ft	fps	Full
	ft/ft					cfs
=====						
Unable to compute this instance.						
1.50	0.0100	0.015	6.58	0.94	5.61	9.10
1.75	0.0100	0.015	6.58	0.85	5.65	13.73
2.00	0.0100	0.015	6.58	0.80	5.62	19.61
1.25	0.0150	0.015	6.58	0.98	6.36	6.86
1.50	0.0150	0.015	6.58	0.83	6.57	11.15
1.75	0.0150	0.015	6.58	0.76	6.56	16.82
2.00	0.0150	0.015	6.58	0.72	6.52	24.01
1.25	0.0200	0.015	6.58	0.87	7.22	7.92
1.50	0.0200	0.015	6.58	0.76	7.33	12.87
1.75	0.0200	0.015	6.58	0.70	7.29	19.42
2.00	0.0200	0.015	6.58	0.66	7.23	27.73
1.25	0.0250	0.015	6.58	0.80	7.90	8.85
1.50	0.0250	0.015	6.58	0.71	7.96	14.39
1.75	0.0250	0.015	6.58	0.66	7.91	21.71
2.00	0.0250	0.015	6.58	0.63	7.83	31.00
1.25	0.0300	0.015	6.58	0.75	8.49	9.70
1.50	0.0300	0.015	6.58	0.68	8.52	15.77
1.75	0.0300	0.015	6.58	0.63	8.45	23.79
2.00	0.0300	0.015	6.58	0.60	8.36	33.96
1.25	0.0350	0.015	6.58	0.72	9.02	10.47
1.50	0.0350	0.015	6.58	0.65	9.02	17.03
1.75	0.0350	0.015	6.58	0.60	8.94	25.69
2.00	0.0350	0.015	6.58	0.57	8.84	36.68
1.25	0.0400	0.015	6.58	0.69	9.49	11.20
1.50	0.0400	0.015	6.58	0.62	9.47	18.21
1.75	0.0400	0.015	6.58	0.58	9.38	27.46
2.00	0.0400	0.015	6.58	0.55	9.27	39.21
1.25	0.0450	0.015	6.58	0.66	9.93	11.88
1.50	0.0450	0.015	6.58	0.60	9.89	19.31
1.75	0.0450	0.015	6.58	0.57	9.79	29.13
2.00	0.0450	0.015	6.58	0.54	9.67	41.59
1.25	0.0500	0.015	6.58	0.64	10.33	12.52
1.50	0.0500	0.015	6.58	0.59	10.28	20.36
1.75	0.0500	0.015	6.58	0.55	10.16	30.71
2.00	0.0500	0.015	6.58	0.52	10.04	43.84
1.25	0.0550	0.015	6.58	0.63	10.71	13.13
1.50	0.0550	0.015	6.58	0.57	10.64	21.35
1.75	0.0550	0.015	6.58	0.54	10.52	32.21
2.00	0.0550	0.015	6.58	0.51	10.39	45.98

VARIABLE VARIABLE		COMPUTED COMPUTED COMPUTED				
=====		=====				
Diameter	Channel	Mannings	Discharge	Depth	Velocity	Capacity
ft	Slope	'n'	cfs	ft	fps	Full
	ft/ft					cfs
=====						
1.25	0.0600	0.015	6.58	0.61	11.06	13.71
1.50	0.0600	0.015	6.58	0.56	10.98	22.30
1.75	0.0600	0.015	6.58	0.52	10.85	33.64
2.00	0.0600	0.015	6.58	0.50	10.71	48.02
1.25	0.0650	0.015	6.58	0.60	11.39	14.27
1.50	0.0650	0.015	6.58	0.55	11.30	23.21
1.75	0.0650	0.015	6.58	0.51	11.17	35.01
2.00	0.0650	0.015	6.58	0.49	11.02	49.99

WATER



SCALE: NTS

PROJECT NO.
2088.008
SHEET NUMBER
EXHIBIT
"A"

PIPELINE NETWORK ANALYSIS
BRIDGER CREEK SUBDIVISION PH 2-3
BOZEMAN, MT

DRAWN BY: JLF
CHECKED BY: JLF
APPROVED BY: JLF
DATE: 1-08-88
QA REVIEW
BY:
DATE:

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 SUMMARY OF ORIGINAL DATA

CyberNet Version 2.18. Copyright 1991,92 Haestad Methods Inc.

Run Description: Basic Network

Drawing: CYBR_06

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
 CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NODE #2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL (ft)
10-BN	0	10	991.5	8.0	92.50	0.00	1009.32
20	20	10	3001.8	8.0	92.50	0.00	
30	30	20	698.1	6.0	90.75	0.00	
40	10	40	1241.4	6.0	90.75	0.00	
50-BN	40	0	1072.1	10.0	94.25	0.00	1037.02
60	30	40	736.5	10.0	94.25	0.00	
70	30	50	281.7	8.0	92.50	0.00	
80	50	60	493.0	8.0	92.50	0.00	
90	20	70	441.6	8.0	92.50	0.00	
100	70	80	124.3	8.0	92.50	0.00	
110	80	90	1222.0	8.0	92.50	0.00	
120	100	90	774.2	8.0	92.50	0.00	
130	110	100	571.0	8.0	92.50	0.00	
140	120	110	1154.9	8.0	92.50	0.00	
150	130	120	767.7	8.0	92.50	0.00	
160	100	130	133.5	8.0	92.50	0.00	
170	140	130	448.2	8.0	92.50	0.00	
180	140	150	1017.7	8.0	92.50	0.00	
190	140	160	563.1	8.0	92.50	0.00	
200	160	170	636.0	8.0	92.50	0.00	
210	170	150	520.3	8.0	92.50	0.00	
220	150	180	436.9	8.0	92.50	0.00	
230	180	190	548.8	8.0	92.50	0.00	
240	190	200	235.2	8.0	92.50	0.00	
250	200	60	1733.5	8.0	92.50	0.00	

JUNCTION NODE DATA

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	CONNECTING PIPES		
10-1		256.00	700.50	10	20	40
20-1		79.00	710.30	20	30	90
30-1		23.00	721.30	30	60	70
40-1		166.00	717.00	40	50	60
50-1		0.00	715.25	70	80	
60-1		0.00	749.50	80	250	
70-1		0.00	700.70	90	100	
80-1		0.00	718.00	100	110	
90-1		0.00	703.00	110	120	
100-1		26.00	686.50	120	130	160
110-1		26.00	682.30	130	140	
120-1		73.00	678.30	140	150	
130-1		23.00	685.30	150	160	170
140-1		26.00	698.30	170	180	190
150-1		29.00	726.50	180	210	220
160-1		0.00	701.30	190	200	
170-1		41.00	733.20	200	210	
180-1		12.00	761.00	220	230	
190-1		0.00	771.80	230	240	

MAXIMUM DIMENSIONS	
Number of pipes	25
Number of pumps	10
Number junction nodes.....	25
Flow meters	10
Boundary nodes	10
Variable storage tanks	10
Pressure switches	10
Regulating Valves.....	10
Items for limited output	25
limit for non-consecutive numbering ..	270

Cybernet version 2.18. SN: 1132183836-25

Extended Description:

U N I T S S P E C I F I E D

FLOWRATE = gallons/minute
HEAD (HGL) = feet
PRESSURE = psig

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: THE FOLLOWING RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

ALL CLOSED PIPES ARE NOTED
ALL PIPES WITH PUMPS
FOLLOWING PIPES
 10 20 30 40 50 60 70 80 90 100 110 120 130
 140 150 160 170 180 190 200 210 220 230 240 250
FOLLOWING JUNCTION NODES
 10 20 30 40 50 60 70 80 90 100 110 120 130
 140 150 160 170 180 190 200
MAXIMUM AND MINIMUM PRESSURES = 2

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES(p) = 25
NUMBER OF JUNCTION NODES(j) = 20
NUMBER OF PRIMARY LOOPS(l) = 4
NUMBER OF BOUNDARY NODES(f) = 2
NUMBER OF SUPPLY ZONES(z) = 1

S I M U L A T I O N R E S U L T S

The results are obtained after 6 trials with an accuracy = 0.00313

S I M U L A T I O N D E S C R I P T I O N

CyberNet Version 2.18. Copyright 1991,92 Haestad Methods Inc.

Run Description: Basic Network

PIPELINE RESULTS

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
 CV -CHECK VALVE RV -REGULATING VALVE TK -STORAGE TANK

PIPE NUMBER	NODE #1	NOS. #2	FLOWRATE (gpm)	HEAD LOSS (ft)	PUMP HEAD (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/1000 (ft/ft)
10-BN	0	10	-167.45	1.24	0.00	0.00	1.07	1.25
20	20	10	159.63	3.44	0.00	0.00	1.02	1.15
30	30	20	273.57	9.13	0.00	0.00	3.10	13.08
40	10	40	-263.82	15.18	0.00	0.00	2.99	12.23
50-BN	40	0	-967.45	11.27	0.00	0.00	3.95	10.51
60	30	40	-537.63	2.61	0.00	0.00	2.20	3.54
70	30	50	241.06	0.69	0.00	0.00	1.54	2.46
80	50	60	241.06	1.21	0.00	0.00	1.54	2.46
90	20	70	34.94	0.03	0.00	0.00	0.22	0.07
100	70	80	34.94	0.01	0.00	0.00	0.22	0.07
110	80	90	34.94	0.08	0.00	0.00	0.22	0.07
120	100	90	-34.94	0.05	0.00	0.00	0.22	0.07
130	110	100	-47.12	0.07	0.00	0.00	0.30	0.12
140	120	110	-21.12	0.03	0.00	0.00	0.13	0.03
150	130	120	51.88	0.11	0.00	0.00	0.33	0.14
160	100	130	-38.18	0.01	0.00	0.00	0.24	0.08
170	140	130	113.06	0.27	0.00	0.00	0.72	0.61
180	140	150	-87.70	0.39	0.00	0.00	0.56	0.38
190	140	160	-51.36	0.08	0.00	0.00	0.33	0.14
200	160	170	-51.36	0.09	0.00	0.00	0.33	0.14
210	170	150	-92.36	0.22	0.00	0.00	0.59	0.42
220	150	180	-209.06	0.83	0.00	0.00	1.33	1.89
230	180	190	-221.06	1.15	0.00	0.00	1.41	2.10
240	190	200	-221.06	0.49	0.00	0.00	1.41	2.10
250	200	60	-241.06	4.27	0.00	0.00	1.54	2.46

JUNCTION NODE RESULTS

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	JUNCTION ELEVATION (ft)	PRESSURE HEAD (ft)	JUNCTION PRESSURE (psi)
10-1		256.00	1010.56	700.50	310.06	134.36
20-1		79.00	1014.00	710.30	303.70	131.60
30-1		23.00	1023.14	721.30	301.84	130.80
40-1		166.00	1025.74	717.00	308.74	133.79
50-1		0.00	1022.44	715.25	307.19	133.12
60-1		0.00	1021.23	749.50	271.73	117.75
70-1		0.00	1013.97	700.70	313.27	135.75
80-1		0.00	1013.96	718.00	295.96	128.25
90-1		0.00	1013.88	703.00	310.88	134.71
100-1		26.00	1013.83	686.50	327.33	141.84
110-1		26.00	1013.76	682.30	331.46	143.63
120-1		73.00	1013.73	678.30	335.43	145.35
130-1		23.00	1013.84	685.30	328.54	142.37
140-1		26.00	1014.11	698.30	315.81	136.85
150-1		29.00	1014.49	726.50	287.99	124.80
160-1		0.00	1014.19	701.30	312.89	135.58
170-1		41.00	1014.28	733.20	281.08	121.80
180-1		12.00	1015.32	761.00	254.32	110.21
190-1		0.00	1016.47	771.80	244.67	106.02
200-1		20.00	1016.96	785.00	231.96	100.52

MAXIMUM AND MINIMUM VALUES

PRESSURES

JUNCTION NUMBER	MAXIMUM PRESSURES (psi)	JUNCTION NUMBER	MINIMUM PRESSURES (psi)
120	145.35	200	100.52
110	143.63	190	106.02

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM BOUNDARY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO BOUNDARY NODES

PIPE NUMBER	FLOWRATE (gpm)
10	-167.45
50	967.45

NET SYSTEM INFLOW = 967.45
NET SYSTEM OUTFLOW = -167.45
NET SYSTEM DEMAND = 800.00

**** CYBERNET SIMULATION COMPLETED ****

DATE: 1/08/1996
TIME: 13:36:27

MAXIMUM DIMENSIONS	
Number of pipes	25
Number of pumps	10
Number junction nodes.....	25
Flow meters	10
Boundary nodes	10
Variable storage tanks	10
Pressure switches	10
Regulating Valves.....	10
Items for limited output	25
limit for non-consecutive numbering ..	270

Cybernet version 2.18. SN: 1132183836-25

Extended Description:

U N I T S S P E C I F I E D

FLOWRATE = gallons/minute
 HEAD (HGL) = feet
 PRESSURE = psig

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: THE FOLLOWING RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

ALL CLOSED PIPES ARE NOTED
 ALL PIPES WITH PUMPS
 FOLLOWING PIPES
 10 20 30 40 50 60 70 80 90 100 110 120 130
 140 150 160 170 180 190 200 210 220 230 240 250
 FOLLOWING JUNCTION NODES
 10 20 30 40 50 60 70 80 90 100 110 120 130
 140 150 160 170 180 190 200
 MAXIMUM AND MINIMUM PRESSURES = 2

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES(p) = 25
 NUMBER OF JUNCTION NODES(j) = 20
 NUMBER OF PRIMARY LOOPS(l) = 4
 NUMBER OF BOUNDARY NODES(f) = 2
 NUMBER OF SUPPLY ZONES(z) = 1

 S I M U L A T I O N R E S U L T S

The results are obtained after 5 trials with an accuracy = 0.00013

S I M U L A T I O N D E S C R I P T I O N

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Run Description: Fire Flow J10-J180 - 2 Hyd's Hi/Low pts.

Drawing: CYBR_06

PIPELINE RESULTS

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
 CV -CHECK VALVE RV -REGULATING VALVE TK -STORAGE TANK

PIPE NUMBER	NODE NOS.		FLOWRATE (gpm)	HEAD LOSS (ft)	PUMP HEAD (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
	#1	#2						
10-BN	0	10	1534.16	75.15	0.00	0.00	9.79	75.80
20	20	10	-271.17	9.19	0.00	0.00	1.73	3.06
30	30	20	588.32	37.71	0.00	0.00	6.68	54.02
40	10	40	-493.01	48.34	0.00	0.00	5.59	38.94
50-BN	40	0	-2265.84	54.52	0.00	0.00	9.26	50.85
60	30	40	-1606.83	19.82	0.00	0.00	6.56	26.91
70	30	50	995.51	9.58	0.00	0.00	6.35	34.03
80	50	60	995.51	16.78	0.00	0.00	6.35	34.03
90	20	70	780.49	9.57	0.00	0.00	4.98	21.68
100	70	80	780.49	2.69	0.00	0.00	4.98	21.68
110	80	90	780.49	26.49	0.00	0.00	4.98	21.68
120	100	90	-780.49	16.79	0.00	0.00	4.98	21.68
130	110	100	-159.49	0.65	0.00	0.00	1.02	1.15
140	120	110	-133.49	0.95	0.00	0.00	0.85	0.82
150	130	120	-60.49	0.15	0.00	0.00	0.39	0.19
160	100	130	595.00	1.75	0.00	0.00	3.80	13.12
170	140	130	-632.49	6.58	0.00	0.00	4.04	14.69
180	140	150	339.16	4.71	0.00	0.00	2.16	4.63
190	140	160	267.33	1.68	0.00	0.00	1.71	2.98
200	160	170	267.33	1.90	0.00	0.00	1.71	2.98
210	170	150	226.33	1.14	0.00	0.00	1.44	2.19
220	150	180	536.49	4.73	0.00	0.00	3.42	10.83
230	180	190	-975.51	17.98	0.00	0.00	6.23	32.77
240	190	200	-975.51	7.71	0.00	0.00	6.23	32.77
250	200	60	-995.51	58.98	0.00	0.00	6.35	34.03

JUNCTION NODE RESULTS

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	JUNCTION ELEVATION (ft)	PRESSURE HEAD (ft)	JUNCTION PRESSURE (psi)
10-1	Fire Flow 15	1756.00	934.16	700.50	233.66	101.25
20-1		79.00	924.98	710.30	214.68	93.03
30-1		23.00	962.69	721.30	241.39	104.60
40-1		166.00	982.50	717.00	265.50	115.05
50-1		0.00	953.10	715.25	237.85	103.07
60-1		0.00	936.33	749.50	186.83	80.96
70-1		0.00	915.40	700.70	214.70	93.04
80-1		0.00	912.71	718.00	194.71	84.37
90-1		0.00	886.21	703.00	183.21	79.39
100-1		26.00	869.43	686.50	182.93	79.27
110-1		26.00	868.77	682.30	186.47	80.81
120-1		73.00	867.82	678.30	189.52	82.13
130-1		23.00	867.68	685.30	182.38	79.03
140-1		26.00	861.09	698.30	162.79	70.54
150-1		29.00	856.38	726.50	129.88	56.28
160-1		0.00	859.41	701.30	158.11	68.52
170-1		41.00	857.52	733.20	124.32	53.87
180-1	Fire Flow 15	1512.00	851.65	761.00	90.65	39.28
190-1		0.00	869.63	771.80	97.83	42.39
200-1		20.00	877.34	785.00	92.34	40.01

MAXIMUM AND MINIMUM VALUES

PRESSES

JUNCTION NUMBER	MAXIMUM PRESSURES (psi)	JUNCTION NUMBER	MINIMUM PRESSURES (psi)
40	115.05	180	39.28
30	104.60	200	40.01

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM BOUNDARY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO BOUNDARY NODES

PIPE NUMBER	FLOWRATE (gpm)
10	1534.16
50	2265.84

NET SYSTEM INFLOW = 3800.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 3800.00

**** CYBERNET SIMULATION COMPLETED ****

DATE: 1/08/1996
TIME: 13:36:27

Cybernet Version: 2.18 SN: 1132183836 08-01-1996
 Description: Fire Flow Phase 2 J100-110-120
 Drawing: C:\2089_006\DRAWINGS\CYBR_06

Fire Flow Summary.

JCT No.	Peak Hour Demand (gpm)	Peak Hour Pressure (psi)	Zone No.	Zone Needed Fire Flow (gpm)	Available Fire Flow (gpm)	@Residual Pressure (psi)	Min. Zone Pressure (psi)	@JCT No.
100	26.0	141.8	1	1526.0	1750.0	69.7	51.9	200
110	26.0	143.6	1	1526.0	1750.0	60.2	51.6	200
120	73.0	145.4	1	1573.0	1750.0	59.7	51.5	200

Cybernet Version: 2.18 SN: 1132183836 08-01-1996
 Description: Fire Flow Phase 3 J180-190-200
 Drawing: C:\2089_006\DRAWINGS\CYBR_06

Fire Flow Summary.

JCT No.	Peak Hour Demand (gpm)	Peak Hour Pressure (psi)	Zone No.	Zone Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Min. Zone Pressure (psi)	JCT No.
180	12.0	110.2	1	1512.0	1750.0	38.6	41.2	200
190	0.0	106.0	1	1500.0	1750.0	37.5	36.2	200
200	20.0	100.5	1	1520.0	1750.0	33.8	40.9	190

 SUMMARY OF ORIGINAL DATA

CyberNet Version 2.18. Copyright 1991,92 Haestad Methods Inc.

Run Description: Basic Network w/o Phase 3 loop

Drawing: CYBR_06

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
 CV -CHECK VALVE RV -REGULATING VALVE

PIPE NUMBER	NODE #1	NOS. #2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.	BND-HGL (ft)
10-BN	0	10	991.5	8.0	119.00	0.00	1009.32
20	20	10	3001.8	8.0	119.00	0.00	
30	30	20	698.1	6.0	118.50	0.00	
40	10	40	1241.4	6.0	118.50	0.00	
50-BN	40	0	1072.1	10.0	119.50	0.00	1037.02
60	30	40	736.5	10.0	119.50	0.00	
70-XX	30	50	281.7	8.0	119.00	0.00	
80	50	60	493.0	8.0	119.00	0.00	
90	20	70	441.6	8.0	119.00	0.00	
100	70	80	124.3	8.0	119.00	0.00	
110	80	90	1222.0	8.0	119.00	0.00	
120	100	90	774.2	8.0	119.00	0.00	
130	110	100	571.0	8.0	119.00	0.00	
140	120	110	1154.9	8.0	119.00	0.00	
150	130	120	767.7	8.0	119.00	0.00	
160	100	130	133.5	8.0	119.00	0.00	
170-XX	140	130	448.2	8.0	119.00	0.00	
180	140	150	1017.7	8.0	119.00	0.00	
190	140	160	563.1	8.0	119.00	0.00	
200	160	170	636.0	8.0	119.00	0.00	
210	170	150	520.3	8.0	119.00	0.00	
220	150	180	436.9	8.0	119.00	0.00	
230	180	190	548.8	8.0	119.00	0.00	
240	190	200	235.2	8.0	119.00	0.00	
250	200	60	1733.5	8.0	119.00	0.00	

JUNCTION NODE DATA

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	CONNECTING PIPES		
10-1		256.00	700.50	10	20	40
20-1		79.00	710.30	20	30	90
30-1		23.00	721.30	30	60	70
40-1		166.00	717.00	40	50	60
50-1		0.00	715.25	70	80	
60-1		0.00	749.50	80	250	
70-1		0.00	700.70	90	100	
80-1		0.00	718.00	100	110	
90-1		0.00	703.00	110	120	
100-1		26.00	686.50	120	130	160
110-1		26.00	682.30	130	140	
120-1	Fire Flow	1573.00	678.30	140	150	
130-1		23.00	685.30	150	160	170
140-1		26.00	698.30	170	180	190
150-1		29.00	726.50	180	210	220
160-1		0.00	701.30	190	200	
170-1		41.00	733.20	200	210	
180-1		12.00	761.00	220	230	
190-1		0.00	771.80	230	240	
200-1		20.00	785.00	240	250	

MAXIMUM DIMENSIONS	
Number of pipes	25
Number of pumps	10
Number junction nodes.....	25
Flow meters	10
Boundary nodes	10
Variable storage tanks	10
Pressure switches	10
Regulating Valves.....	10
Items for limited output	25
limit for non-consecutive numbering ..	270

Cybernet version 2.18. SN: 1132183836-25

Extended Description:

U N I T S S P E C I F I E D

FLOWRATE = gallons/minute
 HEAD (HGL) = feet
 PRESSURE = psig

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: THE FOLLOWING RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

ALL CLOSED PIPES ARE NOTED
 ALL PIPES WITH PUMPS
 FOLLOWING PIPES
 10 20 30 40 50 60 90 100 110 120 130 140 150
 160
 FOLLOWING JUNCTION NODES
 10 20 30 40 70 80 90 100 110 120 130 140 150
 160
 MAXIMUM AND MINIMUM PRESSURES = 1

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES(p) = 25
 NUMBER OF JUNCTION NODES(j) = 20
 NUMBER OF PRIMARY LOOPS(L) = 4
 NUMBER OF BOUNDARY NODES(f) = 2
 NUMBER OF SUPPLY ZONES(z) = 1

 S I M U L A T I O N R E S U L T S

*** WARNING ***

A PORTION OF THE SYSTEM IS DISCONNECTED FROM A BND BY CLOSED LINES

**** A FIX WILL BE ATTEMPTED

THE FOLLOWING JUNCTION NODES ARE DISCONNECTED FROM THE SYSTEM
 DEMANDS AT THESE JUNCTION NODES ARE SET TO ZERO:
 50 60 140 150 160 170 180 190 200

PIPE NO. 70 HAS BEEN OPENED TO REMOVE DISCONNECTION

The results are obtained after 5 trials with an accuracy = 0.00151

S I M U L A T I O N D E S C R I P T I O N

CyberNet Version 2.18. Copyright 1991,92 Haestad Methods Inc.

Run Description: Basic Network w/o Phase 3 loop

Drawing: CYBR_06

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE BN -BOUNDARY NODE PU -PUMP LINE
 CV -CHECK VALVE RV -REGULATING VALVE TK -STORAGE TANK

PIPE NUMBER	NODE #1	NODE #2	FLOWRATE (gpm)	HEAD LOSS (ft)	PUMP HEAD (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/1000 (ft/ft)
10-BN	0	10	637.12	9.26	0.00	0.00	4.07	9.34
20	20	10	-779.61	40.73	0.00	0.00	4.98	13.57
30	30	20	947.39	55.60	0.00	0.00	10.75	79.65
40	10	40	-398.49	19.88	0.00	0.00	4.52	16.02
50-BN	40	0	-1534.88	17.07	0.00	0.00	6.27	15.93
60	30	40	-970.39	5.02	0.00	0.00	3.96	6.81
90	20	70	1648.00	23.97	0.00	0.00	10.52	54.28
100	70	80	1648.00	6.74	0.00	0.00	10.52	54.28
110	80	90	1648.00	66.33	0.00	0.00	10.52	54.28
120	100	90	-1648.00	42.02	0.00	0.00	10.52	54.28
130	110	100	-672.25	5.89	0.00	0.00	4.29	10.31
140	120	110	-646.25	11.07	0.00	0.00	4.12	9.59
150	130	120	926.75	14.35	0.00	0.00	5.91	18.69
160	100	130	949.75	2.61	0.00	0.00	6.06	19.56

FOLLOWING ADDITIONAL PIPES ARE CLOSED :
 170

J U N C T I O N N O D E R E S U L T S

JUNCTION NUMBER	JUNCTION TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	JUNCTION ELEVATION (ft)	PRESSURE HEAD (ft)	JUNCTION PRESSURE (psi)
10-1		256.00	1000.06	700.50	299.56	129.81
20-1		79.00	959.33	710.30	249.03	107.91
30-1		23.00	1014.93	721.30	293.63	127.24
40-1		166.00	1019.94	717.00	302.94	131.28
70-1		0.00	935.36	700.70	234.66	101.69
80-1		0.00	928.62	718.00	210.62	91.27
90-1		0.00	862.29	703.00	159.29	69.03
100-1		26.00	820.27	686.50	133.77	57.97
110-1		26.00	814.38	682.30	132.08	57.23
120-1	Fire Flow	1573.00	803.31	678.30	125.01	54.17
130-1		23.00	817.66	685.30	132.36	57.36
140-1		0.00	1014.93	698.30	316.63	137.20
150-1		0.00	1014.93	726.50	288.43	124.98
160-1		0.00	1014.93	701.30	313.63	135.90

MAXIMUM AND MINIMUM VALUES

PRESURES

JUNCTION NUMBER	MAXIMUM PRESSURES (psi)	JUNCTION NUMBER	MINIMUM PRESSURES (psi)
140	137.20	120	54.17

SUMMARY OF INFLOWS AND OUTFLOWS

(+) INFLOWS INTO THE SYSTEM FROM BOUNDARY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO BOUNDARY NODES

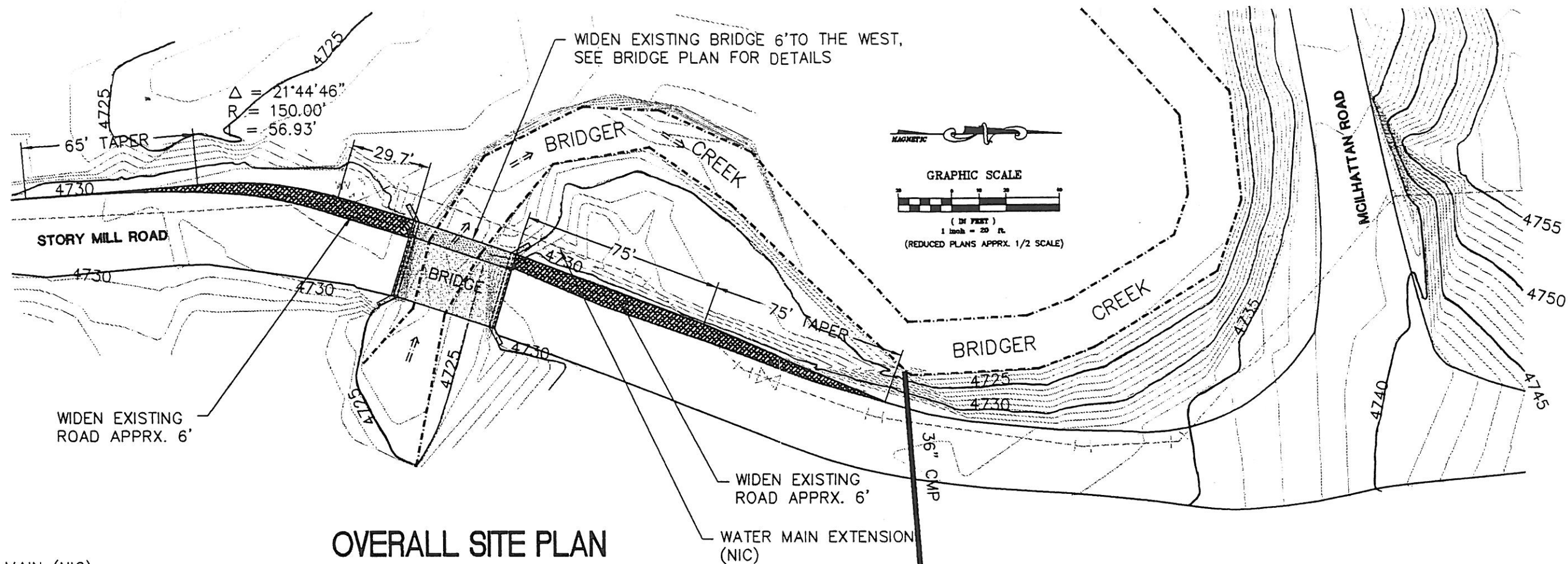
PIPE NUMBER	FLOWRATE (gpm)
10	637.12
50	1534.88

NET SYSTEM INFLOW = 2172.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 2172.00

**** CYBERNET SIMULATION COMPLETED ****

DATE: 1/08/1996
TIME: 16:38:27

H:\2089\006\P2_3CYB.RPT



OVERALL SITE PLAN

WATER MAIN (NIC)

6' WIDENING

± 24'

± 40'

BRIDGE PLAN

SCALE: 1" = 10' (REDUCED PLANS APPRX. 1/2 SCALE)

BRIDGE SECTION A-A

SCALE: 1" = 5' (REDUCED PLANS APPRX. 1/2 SCALE)

BRIDGE SECTION B-B

SCALE: 1" = 5' (REDUCED PLANS APPRX. 1/2 SCALE)

NOTE: EXISTING FOUNDATION TO BE FIELD VERIFIED BY THE ENGINEER PRIOR TO COMPLETION OF CONSTRUCTION DOCUMENTS

**PRELIMINARY
NOT FOR CONSTRUCTION**

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DRAWN BY: KWK	REVISION DATE: REVISION DATE: DATE: 1-4-95
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AMENDMENTS TO COVENANTS

The Bridger Creek Subdivision covenants adopted for Phase 1 and subsequent phases shall be amended to address the following:

1. Applicant shall install an irrigation water distribution system that all lots in Phase 2 and 3 shall be required to connect to and use. Connection fees and operational fees shall be set at the time that the installation costs and operating costs are better known.
2. No basements shall be permitted in Phase 2. Basements shall be allowed in Phase 3.
3. All lots in both phases shall be single family lots with the exception of Lot 16 in Phase 2 which shall be designated a condominium lot with a maximum of 4 living units permitted.
4. Resubdivision of lots shall not be permitted.
5. Covenants, Bylaws and Design Guidelines shall apply to Phase 2 and 3 except as noted above.

H:\2089\006\EA\COVENTS
January 10, 1996

PREAPPLICATION



BOZEMAN CITY-COUNTY PLANNING OFFICE

35 NORTH BOZEMAN AVENUE
P.O. BOX 640, BOZEMAN, MONTANA 59771-0640
PHONE: (406) 582-2360 FAX: (406) 582-2363

November 2, 1995

Mr. Rex Easton
Golf Course Partners, Inc.
9315 Courgar Drive
Bozeman, MT, 59715

RE: Pre-application Plan Review of Bridger Creek Subdivision, Phase II & III

Dear Mr. Easton:

The Bozeman City-County Planning Office, Bozeman Development Review Committee, and other local review agencies have reviewed the pre-application plan submittal for Bridger Creek Subdivision, Phase II & III, and as a result, offer the following comments for your consideration.

The proposed subdivision would divide approximately 60.0 acres into a two-phase residential subdivision consisting of 90 single family residential lots and one townhouse lot, as well as 6.33 acres of park land, exclusive of any required dedicated street right-of-way. The Bozeman Area Master Plan designates the property to develop as Urban Residential Infill which allows single family development at a density of 3-6 dwelling units per acre. The property is zoned R-3, Residential Medium Density District, which allows for single-family and townhouse residential development.

The following comments are offered to assist you in preparation of your application for preliminary subdivision plat review:

Submittal Requirements:

- 1 - As with the previous pre-application plan review, this application did not contain a current topographical map with an outline of the proposed subdivision. It also did not confirm or locate the boundaries of any wetlands within the area. Both of these items must be addressed with the application for preliminary subdivision plat review.
- 2 - An Environmental Assessment and Community Impact Statement report must be submitted with the preliminary plat application. This report should include an up-dated analysis of the geometrics of the Story Mill Road bridge over Bridger Creek. As commented in January of 1995, please keep in mind that the information submitted for these reports must be complete, or the application will not be accepted. Simply requesting review by the required agencies and submitting a copy of that request in the study is not

acceptable. The agencies must respond, and the information provided by them must be used in the study to identify and mitigate concerns and impacts.

Traffic/Roads:

- 1 - A detailed traffic study analysis for both Phase II and Phase III shall be completed for submittal with the next preliminary plat application submitted to the Planning Office.
- 2 - McIllhattan Road will be required to be improved to a County paved road with a twenty-eight (28) foot wide paved cross-section including a delineated bike lane on one (1) side prior to Final Plat approval of either of the two phases. McIllhattan will be improved to the north boundary of said property prior to the filing of the Final Plat for Phase III. All access and road improvements to McIllhattan will require approval by the County Road Superintendent, as well as the City Engineer's Office.
- 3 - It may be necessary to require dedication of slope easements for the roadway cuts/fills (particularly in Phase III) that extend beyond the right-of-way dedication for McIllhattan Road. The C.I.S. submitted with the preliminary plat should respond to this item.
- 4 - The Gallatin County Road Office notes that guard rails may be necessary along McIllhattan Road where the slope of the roadway shoulder is too severe. Responding to item three (3) above in the C.I.S. will assist the County road office in making a determination on the matter.
- 5 - Section 16.12.040.M of the Bozeman Area Subdivision Regulations requires that all subdivisions with six (6) or more lots shall provide a second means of access. Unless, in the judgement of the Governing Body, if a second dedicated right-of-way cannot be provided for reasons of topography or other physical conditions, an emergency access, built to the standards detailed in the subdivision regulations, may be approved. The application for preliminary plat review of Phase II must include a request by the developer to waive the required secondary access under Section 16.12.040.M, as well as define the parameters of the emergency access that is proposed along the rear of Lot #1 - Lot #4. A typical section of the emergency access as outlined in this section of the subdivision regulations must also be provided.
- 6 - The thirty (30) foot wide emergency access easement between Lot #4 and Lot #5 of Phase II should be identified as a parcel of common ownership by the homeowner's association for the purpose of providing an emergency access.
- 7 - The two curves adjacent to Lot #15 and Lot #18 of Phase II must maintain the one

hundred fifty (150) foot minimum radius curve allowed for a local subdivision street.

8 - The preliminary plat for Phase III must confirm the radius of the deadend cul-de-sac at the end of Turnberry Court and Caddie Court.

9 - A one (1) foot wide "No Access" strip shall be delineated on the preliminary plat along McIlhhattan Road and Story Mill Road to eliminate any potential for direct access from any of the residential lots.

10 - All streets abutting McIlhhattan Road and/or Story Mill Road should have stop signs installed at their respective intersections.

11 - Because the anticipated traffic generated from the seven (7) lots accessing onto Story Mill Road will not exceed one hundred (100) average daily trips per day, the Development Review Committee and County Road Superintendent are reluctant to require the applicant to pave that portion of the County road fronting the subject property to a County paved road standard. None the less, the applicant must justify in the C.I.S. report, which is submitted with the preliminary plat application, grounds for supporting a request to improve Story Mill Road to only a County gravel road standard.

Water and Sanitary Sewer:

1 - The proposed water system for Phase II is dependent on the construction of the Phase III distribution system and a proposed trunk line within Story Mill Road. Phasing of the project, including the construction of a domestic water system to achieve a looped system to Phase II is critical to the project construction. The looped water system from Story Mill Road must be constructed prior to the filing of the Final Plat for either Phase II or Phase III.

2 - Plans and specifications for water and sewer main extensions must be prepared by a professional engineer registered in the state of Montana and submitted to both the City of Bozeman and the State Department of Health and Environmental Sciences for review and approval prior to proceeding with any construction of the project.

3 - All water and sewer main extensions must be installed and accepted by the City of Bozeman prior to issuance of any building permits for this development.

4 - The design plans for water and sewer for this project must meet all City of Bozeman standards for quality, quantity and construction. Specific comments on water and sewer main extensions will be made during City of Bozeman review of the water and sewer plans when submitted for review.

- 5 - Water rights or cash in-lieu thereof will need to be satisfied for each of the remaining phases by the applicant prior to filing of each Final Plat.
- 6 - An access and occupancy easement will be required for the existing groundwater monitoring well shown on Lot #23 of Phase III and delineated accordingly on the Final Plat. The City will likely seek abandonment of the existing groundwater monitoring shown on Lot #32 of Phase III. If this is not possible, the Director of Public Service will recommend relocating said well to an area within the right-of-way for St. Andrews Drive. The City will attempt to locate the replacement well on the extension of a lot line to avoid conflicts with future driveways, etc.
- 7 - An all weather access road is recommended by the City Engineer's Office to be constructed over the proposed sanitary sewer and water main extension between McIlhattan Road and Augusta Drive.

Storm Water Drainage:

- 1 - The final improvement plans will need to include a Storm Water Drainage/Treatment Plan. The Plan must demonstrate adequate site drainage, adequate drainage to an acceptable discharge device, storm water discharge destination, necessary easements for conveyance parcels, and storm water detention/retention basin details (as necessary). The plan currently shows drainage flowing through easements between lots at a number of locations. In lieu of drainage easements, it's recommended that open space or Homeowner's Association owned parcels be dedicated for the conveyance of drainage.
- 2 - A drainage easement must be shown between Lot #14 and Lot #15 of Phase III. Use of the natural draw on the interior lots along St. Andrews Drive as an integral part of the drainage system raises a number of concerns regarding long-term maintenance. These concerns should be addressed by the applicant in the submittal for preliminary plat review of the next phase.

Utilities:

- 1 - The pre-application suggests that all public utilities will be installed along the front of all lots, in-lieu of providing utility easements along the rear and side of all lots. Therefore, the applicant must request with the preliminary plat application for either phase, a waiver to Section 16.12.050 - Easements, which requires utility easements along the side and rear lot lines, and furthermore shall provide with the preliminary plat application **written approval from all utility agencies** that utilities can be installed along the street frontage of each residential lot and that utility easements are not necessary along the rear and side of the residential lots. The preliminary plat application will not be

processed without written approval from all of the utility agencies.

2 - The utility easements delineated on Phase II should also be identified at random as twelve (12) foot wide public utility easements similar to that of Phase III.

Park Land:

1 - The comments provided from various review agencies as it pertains to park land and/or open space requirements is somewhat mixed, dependent on the direction from which each agency is coming from. Generally however, the comments provided suggest that the proposed park land in Phase II and III are generally not acceptable for use as a public park. The Recreation and Parks Advisory Board concluded that implementing an overall network of public trails in this area is more important than dedicated park land. A continuation of the trail system in Phase I to the East Gallatin Park Trail is recommended. The park land in Phase III is inaccessible and is unusable steep land that only serves as a buffer to the landfill. The Board prefers to see a trail corridor from McIllhattan Road to Story Mill Road adjacent to the northern boundary of the subdivision (see copy of the attached memo dated October 16, 1995).

2 - The Park/Forestry Superintendent notes that all park boundaries, irrespective of their location, shall be delineated in the approved manner by the Superintendent. All landscaping and/or tree planting on public streets and ways shall be approved by the Forestry Superintendent prior to any planting. All construction debris (concrete, rocks, etc.) shall be removed from the planting area (between the back of the curb & the sidewalk) and the area filled with good top soil (see copy of the attached memo dated October 13, 1995).

3 - The Superintendent of Street/Sanitation is requesting a one hundred (100) to one hundred and fifty (150) feet buffer area between the existing landfill and any housing development along Phase III. In order to protect the future residential phases of Bridger Creek Subdivision from any impact which may be attributed from the existing landfill facility it is critical that some sort of buffer zone prevail between the two properties (see copy of attached memo dated October 17, 1995). The Director of Public Service generally supports the recommendation of the buffer between the landfill facility and any residential development along the north boundary of the subdivision between Story Mill Road and McIllhattan Road (see attached copy of memo dated October 19, 1995).

4 - Generally speaking the difference of opinion as to the function of park land for Phase II and III leaves the developer at loose ends. This issue will obviously be of great concern and lengthy discussion before the Planning Board and City Commission. As the intent of the park land for Phase II and III is generally intended for the enjoyment and use

of the general public, as well as for future residents of the subdivision, it would be appropriate to first begin with resolving the concerns of the Recreation and Parks Advisory Board and then prepare to respond to the comments provided by members of the Development Review Committee.

5 - The Director of Public Service notes that the ultimate use of the landfill property is clearly open space/recreation of some variety. While this may argue against the buffer strip in Phase III, there may be a need to secure certain areas of the landfill (e.g. the leachate collection pond, the stormwater detention pond, etc.) after closure thereby eliminating public access.

Subdivision Design:

1 - Phase III has two lot numbers for each residential lot from Lot #1 through Lot #7. This is a result of the seven (7) lots along Story Mill Road also being numbered Lot #1 through Lot #7. Either a Phase IV should be proposed or those lots along Story Mill Road be identified as Lot #38 through Lot #44.

2 - Direct access onto Story Mill Road for Lot #1 and Lot #2 may be an issue with the County Road Superintendent and should be verified prior to submitting an application for preliminary plat review of Phase III. At a minimum the applicant may considered a shared access easement between the two lots.

3 - The location of the monitoring well and drainage easement on Lot #32 of Phase III will influence the siting of any residence on the property and may very well create problems for the future property owner. Any variances from the required yard setbacks that may be potentially requested on this property for a building permit will not be supported by the Planning Office as they are being self imposed by the developer.

4 - The irregular shape of Lot #31 of Phase II may also create a problem with the future owner in terms of setbacks for a building permit. Again the Planning Office will not support any request for variances from the required yard setbacks and is entertaining the possibility of requiring language in the protective covenants addressing this issue for both Lot #31 of Phase II and Lot #32 of Phase III.

Covenants:

1 - Protective covenants for Phase II and Phase III should be submitted with the preliminary plat for review by the Planning Office, Planning Board and City Commission. Please make sure to provide the necessary changes, revisions, additions, etc, to the homeowner's association documents that were prepared and filed with Phase I. The

Rex Easton
November 2, 1995
Page Seven

Declaration of By-laws and Restrictive Covenants for Phase II and Phase III must be submitted with the preliminary plat application, including any revisions to the landscape and architectural guidelines, trial system, park land, etc.

2 - Please make sure to submit an example of all of the required certificates with the appropriate language that is required on the subdivision plat.

A copy of all the comments received by the D.R.C. and other local agencies are attached for your review. Please keep in mind that while all agencies attempt to identify all issues and concerns related to the pre-application plan, additional comments or concerns may be identified during the Preliminary Plat application.

Attached is a copy of the subdivision procedures for preliminary subdivision plat review, as well as the preliminary plat application. Please make sure to review the pre-application and preliminary plat submittal requirements to assure that all the required information and data is submitted with the application. Because of the limited sixty (60) day period to act on an application for preliminary plat review, an incomplete submittal will not be processed by the Planning Office until all of the required information is provided.

If you have any questions regarding the above comments, the application for preliminary plat review, or any general concerns regarding the proposed subdivision, don't hesitate to contact me at the Planning Office.

Sincerely,



Dave Skelton
Senior Planner

DS/dps

Attachments

cc: Keith Belden, Morrison-Maierle Inc.
Phill Forbes, Director of Public Service
John Pavsek, City Engineer's Office



CITY OF BOZEMAN

Bozeman, Montana


October 19, 1995

RECEIVED BY

OCT 20 1995

CITY - COUNTY PLANNING

TO: City-County Planning Staff

FROM: Phillip J. Forbes, Director of Public Service 

RE: Bridger Creek Subdivision - Phases 2 & 3
Preapplication Comments

In addition to the comments that were expressed at the last DRC meeting, I would like to add the following for consideration by the applicant.

1. The applicant's engineer recommended additional inspection and review of the Story Mill Road bridge over Bridger Creek at the time any phases beyond Phase 1 were proposed. I concur with that recommendation, and the time is now.
2. A detailed traffic study should be completed for submittal with the next phase of development. Any future street improvement recommendations will be based on said study.
3. Given the relative lack of access to the park land proposed in Phase 2, I support allowing all parkland dedication for Phases 2 & 3 be allowed to be satisfied with a single, contiguous park in Phase 3.
4. Depending on the timing of Phase 3 development, in relation to the closing of the expansion area at the landfill, I support the recommendations made by the Parks and Streets Superintendents for a park / buffer strip along this property's north boundary between Story Mill Road and McIlhatten Road.
5. The ultimate use of the landfill property is clearly open space / recreation of some variety. While this may argue against the buffer strip comment above, there may be a need to secure certain areas of the landfill (e.g. the leachate collection pond, the stormwater detention pond, etc.) after final closure thereby eliminating public access. The buffer strip / park would guarantee public park access between Story Mill Road and McIlhatten Road.
6. The City will likely seek abandonment of the existing groundwater monitoring well shown on Lot 32 in Phase 3. If this is not possible, I will recommend relocating said well to an area within the right-of-way for St. Andrews Drive. We

will attempt to locate the replacement well on the extension of a lot line to avoid conflicts with future driveways, etc.

7. An access and occupancy easement will be required for the existing groundwater monitoring well shown on Lot 23 in Phase 3.

8. We may need to require dedication of slope easements for any roadway cuts / fills (particularly in Phase 3) that extend beyond the right-of-way dedication.

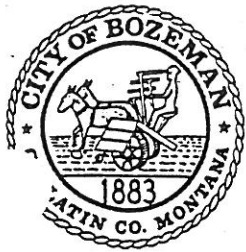
9. The secondary access shown for Phase 2 is so close to the primary, public street access as to be ineffective, in my opinion. If not otherwise required in the Subdivision regulations, I would not be inclined to require construction of the second access shown.

10. A drainage easement must be shown between Lots 14 & 15 in Phase 3. Use of the natural draw on the interior lots along St. Andrews Drive as an integral part of the drainage system raises a number of concerns regarding long-term maintenance. These concerns should be addressed by the applicant in the submittal of the next phase.

11. Water rights or cash in-lieu thereof will need to be satisfied for each phase prior to the filing of each plat.

Please contact me if you have any questions on the above.

cc: Craig Brawner
Roger Sicz
John McNeil
Larry Woodward
File



THE CITY OF BOZEMAN

35 NO. BOZEMAN AVE.

P.O. BOX 640

CARNEGIE BUILDING

BOZEMAN, MONTANA 59771-0640

BUILDING INSPECTION PHONE/TDD (406) 582-2375

ENGINEERING DEPARTMENT PHONE/TDD (406) 582-2380

MEMORANDUM

TO: Therese Berger, Planning Secretary
FROM: John P. Pavsek, Project Engineer
DATE: October 17, 1995
RE: Bridger Creek Major Subdivision - Phases 2 & 3
Pre-Application

The following is a list of pre-application comments in response to your October 10, 1995 memo. Note that standard City Engineering conditions will be recommended at the final application phase of the project. The following represents special items of concern:

1. Two curves adjacent to Lots 15 and 18, respectively, appear to be less than the 150-foot minimum radius curve allowed for a minor street (in accordance with Subdivision Code Section 16.12.040, Item K.). The plans should be changed to allow for the minimum radius curve.
2. The final improvement plans will need to include a Storm Water Drainage/Treatment Plan. The Plan must demonstrate adequate site drainage, adequate drainage to an acceptable discharge device, storm water discharge destination, necessary easements for conveyance parcels, and storm water detention/retention basin details (as necessary). The plan currently shows drainage flowing through easements between lots at a number of locations. In lieu of drainage easements, it's recommended that open space or Homeowner's Association owned parcels be dedicated for the conveyance of drainage.
3. The Phase 2 water system is wholly dependent on the construction of the Phase 3 distribution system and a proposed trunk line Story Mill Road. Phasing of the project, including the construction of a water system to achieve a looped system to Phase 2, is critical to the project construction. I recommend that we have some assurance that the looped system from Story Mill Road and through Phase 3 be constructed at the time of construction of Phase 2 improvements.
4. A secondary access should be provided to the northwestern part of the looped street. All subdivisions with six or more blocks must provide a secondary means of access, unless, in the judgement of the appropriate governing body, a second dedicated right-of-way cannot be provided for reasons of topography. In that case, an emergency access may be approved.

5. All accesses and improvements to McIlhattan Road must be approved by the County Road Commissioner.
6. An all weather access road shall be constructed over the proposed sanitary sewer and water main extending between McIlhattan Road and Augusta Drive.
7. An updated analysis of the geometrics of the Story Mill Road bridge over Bridger Creek should be conducted for review with the subdivision.
8. McIlhattan Road should be improved to a full County standard up to the northerly property boundary of Phase 2.

Please contact me if you have any questions on this project.

cc: DRC
Project File



THE CITY OF BOZEMAN

411 E. MAIN ST. P.O. BOX 640 PHONE/TDD (406) 582-2300
BOZEMAN, MONTANA 59711-0640

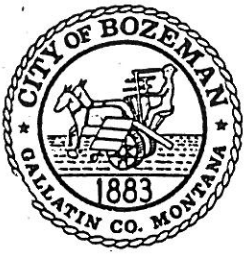
TO: DRC Committee
FROM: Roger W. Sicz, Street/Sanitation Superintendent *R. Sicz*
RE: Bridger Creek Subdivision-Phase 2 & 3
DATE: October 17, 1995

The Street/Sanitation Department has the following concerns and/or comments regarding the above referenced project:

1) **I want to make this first comment very clear:** At a minimum, a 100-150 foot buffer area should exist between the sanitary landfill and any housing development such as the one purposed by Bridger Creek Subdivision Phase 3. In order to protect the adjacent property owner (Bridger Creek Sub) from any impact which may be attributed from the existing landfill facility it is critical that some sort of buffer zone prevail between the two properties. I would recommend that because of this required buffer area that a 117 foot strip of dedicated **Park Land** be planned for the Northern property boundry of the Phase 3 development. This will help insure that both the sanitary landfill and the housing development to the South are equally protected from possible conflicts.

Even with the landfill expansion area meeting all current State & Federal guidelines and regulations it is still a Sanitary Refuse Disposal area which gives off foul odors from time to time, attracts birds, has blowing litter on occasion, generates large equipment noises & dust, has numerous traffic entering and exiting, etc.. The fact must be recognized that the City Landfill was there first and represents a large investment by the City of Bozeman community.

2) All streets abutting McIlhatten Road and/or Story Mill Road should have stop signs installed at their respective intersections.



THE CITY OF BOZEMAN
411 E. MAIN ST. P.O. BOX 640 PHONE/TDD (406) 586-3321
BOZEMAN, MONTANA 59771-0640

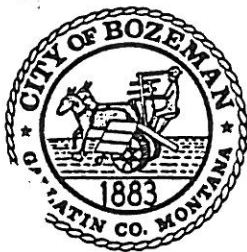
I N T E R

O F F I C E

MEMO

To: DRC, Dave Skelton
From: Fred Shields, Superintendent of Water/Sewer *fs*
Subject: Plan Review Comments, Bridger Creek Subdivision Phases 2 & 3
Date: October 17, 1995

1. Plans and specs for water and sewer main extensions must be prepared by a professional engineer registered in the state of Montana and submitted to both the City of Bozeman and the State Department of Health and Environmental Sciences for review and approval prior to start of any construction.
2. All water and sewer main extensions must be installed and accepted by the City of Bozeman prior to issue of any building permits for this development.
3. Water mains must be adequately looped with each phase.
4. Specific comments on water/sewer extensions will be made during City of Bozeman review of the water/sewer plans when submitted for review.
5. The design plans for water and sewer for this project must meet all City of Bozeman standards for quality, quantity and construction.



THE CITY OF BOZEMAN

411 E. MAIN ST. P.O. BOX 640 PHONE/TDD (406) 582-2300

BOZEMAN, MONTANA 59711-0640

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OCT 16 1995

CITY-COUNTY PLANNING

TO: Therese Berger, Planning Secretary

From: John C, McNeil, Park/Forestry Superintendent *JCM*

RE: Pre-application Comments, *Bridger Creek 2 & 3*

Date: October 13, 1995

The Park Dedication as plated in phase 2 is unacceptable for use as a Public Park.

The Parks for both phase 2 & 3 shall be contiguous, be located along the north boundary with the City of Bozeman property & be connect with both McIlhattan road and Story Mill road.

All Park boundaries shall be delineated in the approved manner.

All landscaping and or Tree planting on public streets and ways shall be approved by the Forestry Superintendent prior to any planting. All construction debris [concrete, rocks, etc.] shall be removed from the planting area [between the back of the curb & the sidewalk] and the area filled with good top soil.



BOZEMAN RECREATION DEPARTMENT

1211 W. MAIN ST. P.O. BOX 640 PHONE (406) 587-4724
BOZEMAN, MONTANA 59715-0640

RECEIVED BY

OCT 16 1995

CITY - COUNTY PLANNING

M E M O

TO: Therese Berger, Planning Secretary
FROM: Recreation and Parks Advisory Board
DATE: October 16, 1995
RE: Bridger Creek Phases 2 and 3, Pre-application Plan

The Subdivision Review Committee of the Recreation and Parks Advisory Board met on October 13, 1995, to review the pre-application plan. Our concern is the overall network of public trails in this area. The board recommends a dedicated trail corridor rather than dedicated parks. A continuation of the trail south of Phase 1 to the East Gallatin Park Trail is recommended. In Phase 2 the park land is not wide enough for multi-use ball fields and there is no reasonable public access from the north. The park area shown would be acceptable as a homeowners park.

The park land shown in Phase 3 is inaccessible and is unusable steep land that only serves as a buffer to the landfill. The board prefers to see a trail corridor from McIlhattan to Story Mill Road adjacent to the northern boundary.

If the plan is revised to include dedicated trail corridors, the committee recommends connecting trails of the southern trail corridor to Phase 2 to create a trail network.

BOZEMAN POLICE DEPARTMENT



Law & Justice Center
615 South 16th Avenue
Bozeman, MT 59715
(406) 582-2000

TDD/TTY 582-2001 FAX 582-2002

TO: Therese Berger, Planning Secretary
Bozeman City-County Planning Office
35 North Bozeman
Bozeman, MT 59715

RECEIVED BY

OCT 17 1995

FROM: Melvin McCarver, Captain
Bozeman Police Department

CITY - COUNTY PLANNING

RE: Bridger Creek Phase 2-3

DATE:

When reviewing the proposed project several safety and law enforcement concerns come to mind. The first being the traffic increase in the area and the second is how will increased calls for service (CFS) affect our ability to protect the public.

First, increased traffic in any area is of great concern to safety, peace and harmony of residents in the area. As a general rule, well designed and signed streets help decrease accidents and reduce the amount of enforcement needed to maintain safety.

Second, increased CFS in any area will have an impact on the entire city. As developments grow around the out skirts of town, distance between calls becomes a major safety factor in response time and the ability to adequately patrol the area. As such, thoughtful design of an area can help reduce the potential CFS and promote a safe and crime free area.

This particular subdivision raises a couple of concerns, the first being it's location and the second being the access. The location is almost like an island and stretches the populated area of Bozeman even further north, stretching law enforcement resources even further. The primary access road has been improved, however traffic will increase greatly and with it the probability of more accidents and a dedication of more resources to traffic control.



MONTANA POWER COMPANY

P.O. BOX 490, BOZEMAN, MONTANA 59771-0490

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OCT 24 1995
CITY - COUNTY PLANNING

RANDY SULLIVAN
OPERATIONS MANAGER

October 23, 1995

Theresa Berger
Bozeman City County Planning Office
P.O. Box 640
Bozeman, Mt. 59771-0640

Re: Bridger creek Phases 2 & 3

Dear Ms. Berger,

Thankyou for the opportunity to review the Pre-Application Plan for the above project. The Montana Power Company will provide Electric and natural gas service to the development as per the applicable Montana Public Service Commission tariffs. Presently, there is a proposed change in the tariffs which has been submitted to the Commission and may result in substantial cost to the developer/owner, for these services.

In the short term, no significant off premise construction will be required. However, as the area builds out, existing gas mains in the Bridger Drive area will need to be upgraded. These upgrades will provide improved service to the area.

Also, we will be working in cooperation with the developer to upgrade or place underground, the existing overhead line along McIlhattan Road adjacent to the subdivision.

We also request that the utility easements on the drawing for Phase 2 be labeled "12' P.U.E. (typ.) " as on phase 3.

Again, thankyou for the opportunity to comment on the project.

Sincerely,

A handwritten signature in cursive script that reads "Randy".

Randy Sullivan
Operations Manager

LETTERS



901 TECHNOLOGY BLVD • P.O. BOX 1113 • BOZEMAN, MT 59771 • 406-587-0721 • FAX: 406-587-1176

ENGINEERS
SCIENTISTS
SURVEYORS
PLANNERS

December 15, 1995

Natural Resources Conservation Service
Gordon Hill
3710 Fallon Drive, Box B
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Wendy:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We are requesting any information that your agency can provide in reference to the soils. We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

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December 15, 1995

Montana Department of Fish, Wildlife and Parks
1400 S. 19th Avenue
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Dick:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

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December 15, 1995

State Historic Preservation Office
225 North Roberts
Helena, MT 59620-9990

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Sir/Madam:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We are requesting your agency to provide a review of the cultural resource records for this area. We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

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December 15, 1995

Rob Bukvitch
Montana Department of Transportation
P.O. Box 1110
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Rob:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

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December 15, 1995

Montana Power Co.
Randy Sullivan
P.O. Box 490
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Randy:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

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December 15, 1995

TCI Cablevision of Montana, Inc.
P.O. Box 1925
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Sir/Madam:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

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December 15, 1995

US West Communications
2707 W. Main
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Sir/Madam:

C
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Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

KSB

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ENGINEERS
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PLANNERS

December 15, 1995

Three Rivers Disposal
P.O. Box 3588
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Sir/Madam:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

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December 15, 1995

Fire Chief, Chuck Winn
Bozeman City Fire Department
P.O. Box 640
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Chuck :

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Y
Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

KSB

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ENGINEERS
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PLANNERS

December 15, 1995

Gallatin County Sheriff
Bill Slaughter
615 S. 16th
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Bill:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

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901 TECHNOLOGY BLVD • P.O. BOX 1113 • BOZEMAN, MT 59771 • 406-587-0721 • FAX: 406-587-1176

December 15, 1995

Med Trans Montana
Cliff Halls
2101 Industrial Drive
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Cliff:

Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

KSB

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901 TECHNOLOGY BLVD • P.O. BOX 1113 • BOZEMAN, MT 59771 • 406-587-0721 • FAX: 406-587-1176

ENGINEERS
SCIENTISTS
SURVEYORS
PLANNERS

December 15, 1995

Bozeman School District
Gary J. Griffith, Supervisor
Maintenance & Operations
P.O. Box 520
Bozeman, MT 59715

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Gary:

C
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Enclosed is a copy of the proposed development for Bridger Creek Subdivision - Phase 2 and Phase 3. We are presently preparing an Environmental Assessment and Community Impact Statement to be submitted with the Preliminary Plat. It is anticipated that Phase 2 will consist of 48 lots with 51 units (47 single family lots, and 1 multi-family lot). Phase 3 will have 44 single family lots with 44 units. Your input is being solicited regarding any impact that this development may have on the site or on your facility.

We would appreciate a department response by December 29, 1995 if possible. Responses received will be included in the Bridger Creek Subdivision Phase 2 and Phase 3 Environmental Assessment and Community Impact Statement.

If you have any questions or need any additional information please contact our office at 587-0721.

Sincerely,
MORRISON-MAIERLE, INC.

Keith S. Belden, P.E.
Bozeman Branch Office

KSB

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State Historic Preservation Office

Montana Historical Society

1410 8th Avenue • PO Box 201202 • Helena, MT 59620-1202 • (406) 444-7715 • FAX (406) 444-6575

January 2, 1996

Keith S. Belden
Morrison/Maierle
P.O. Box 1113
Bozeman, MT 59771

RE: Cultural Resource File Search - Bridger Creek Subdivision: T01S/R06E/S.31; GA Co.

Dear Mr. Belden:

According to the statewide cultural site database, the Northern Pacific Railroad (#24GA1096) is the only cultural site currently recorded in the above cited legal location. Absence of additional sites may reflect a lack of previous survey rather than a known absence of cultural resources, as this office has no record of any cultural resource inventory surveys having been conducted in the project location.

The railroad has been determined eligible for listing on the National Register of Historic Places. If the railroad will be impacted, we ask for additional details regarding the degree and location of disturbance.

If the subdivision area has never been extensively disturbed, we believe there is a good chance that unknown or unrecorded cultural resources lie in the area of potential effect, given its location so near a permanent watercourse. If new ground will be disturbed during the course of this development, it appears that cultural resource inventory survey is warranted prior to initiation of construction activities.

Thank you for the opportunity to comment.

Sincerely,

Leanne Kurtz
Cultural Records Manager

FILE: Local Planning/Subdivision/1995

*Montana Department
of
Fish, Wildlife & Parks*



Decision Notice and Finding of No Significant Impact
For Sanitary Sewer Proposal On
East Gallatin Recreation Area and
Cherry River Fishing Access Site

Department of Fish, Wildlife and Parks, Region 3
1400 S. 19th
Bozeman, MT 59715

July 12, 1993

Description of the Proposed Action:

Golf Course Partners, Inc., Rex Easton, President, has requested a easement across two Department of Fish, Wildlife and Parks properties adjacent to the East Gallatin River approximately 1/2 mile north of Bozeman, for a sanitary sewer to serve the Bridger Creek Subdivision.

MEPA Process:

On June 9, 1993, a draft EA was released by the Region for a 30 day comment period. During that time, the MDFWP received two written comments. Comments were received suggesting that (1) legal notices advertising the release and availability of the draft EA be listed as public notice documentation, (2) if the sewer line trench intersects the old dump site at East Gallatin Recreation Area, there may be some health concerns that will need to be addressed, and (3) that prior to issuance of an easement, a cultural survey of the properties be conducted and clearance given by the State Historic Preservation Office (SHPO). In addition, the Montana Promotion Division of the Department of Commerce commented that the development of the Bridger Creek Subdivision and associated golf course will impact the tourism economy by increasing the quality of golfing opportunities.

Finding of No Significant Impact (FONSI):

Based on the analysis in the Environmental Assessment (EA), I find Alternative C, construction of sewer line where easement has been applied for, pending approval by SHPO, to be the preferred alternative. I have evaluated the EA and applicable laws, regulations, and policies and have determined that this action will not have a significant effect on the human or natural environment. Therefore, an environmental impact statement will not be prepared.

The final Environmental Assessment, and the FONSI, may be viewed at or obtained from the Department of Fish, Wildlife and Parks, Region 3, Bozeman, Montana. Please direct requests and questions to:

Robert R. Martinka
1400 S. 19th
Bozeman, MT 59715
(406) 994-4042



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ENGINEERS
SCIENTISTS
SURVEYORS
PLANNERS

January 10, 1996

Leanne Kurtz
Cultural Records Manager
State Historic Preservation Office
PO Box 201202
Helena, MT 59620-1202

Subject: Bridger Creek Subdivision: T01S/R06E/S.31/GA Co.

Dear Leanne:

Thank you for your comments in regards to Phases 2 and 3 of Bridger Creek Subdivision. We offer the following additional information for your resource search:

- The Northern Pacific Railroad and all artifacts associated with it were removed from the site over 30 years ago. At the north end of the project there exists a cross culvert and a small portion of the embankment, both of which were incorporated into the golf course design. The culvert still functions conducting runoff to one of the constructed ponds. The remnant of the old railroad bed is part of the cart path. No disturbance of these areas will result as a result of this development.
- All development shall occur on land that has been farmed since before the railroad was constructed. No undisturbed lands shall be built upon.
- Attached is a letter from the Montana Department of Fish, Wildlife and Parks regarding a survey of this same area. This earlier resource search was done in conjunction with a sanitary sewer main extension that was built to serve the proposed development. Neither we nor the applicant have any record of these comments in our files. It may be that DFWP handled the correspondence and we never received the same. It might be fruitful to review your records for this data.

Please call if you have any questions.

Sincerely,

Morrison-Maierle, Inc.

Keith S. Belden, PE
Bozeman Branch Office

H:\2089\006\SHPO
January 10, 1996

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RECEIVED DEC 13 1995



P.O. BOX 490, BOZEMAN, MONTANA 59771-0490

MONTANA POWER COMPANY

RANDY SULLIVAN
OPERATIONS MANAGER

December 12, 1995

Keith Belden
Morrison Maierle, Inc.
901 Technology Blvd.
Bozeman, MT 59715

RE: Bridger Creek Subdivision Phase 2 & 3

Dear Keith;

The proposed easements shown on the drawings of Phase 2 and Phase 3 will be adequate for Montana Power to provide electric and natural gas service. The only concern I have is that the covenants on the park lots allow utility access, so Turnberry and Caddie courts can be connected.

If I can provide you with any additional information, please don't hesitate to contact me .

Sincerely,

A handwritten signature in black ink, appearing to read 'Eric Neill'.

Eric Neill
Division Engineer

RECEIVED DEC 21 1995

December 18, 1995

Morrison-Maierle Inc.
Keith S. Belden, P.E.
901 Technology Blvd
P.O. Box 1113
Bozeman Mt 59771

RE: Bridger Creek Subdivision - Phase 2 & 3
Environmental Assessment and Community Impact Statement
MM# 2089.006.040.0310

Dear Mr. Belden

Please be advised that our company is in a position to provide solid waste collection services for the Bridger Creek Subdivision.

If you have any questions or require any additional information, please do not hesitate to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "Dick Kountz". The signature is written in a cursive style with a large, looping initial "D".

Dick Kountz
Assistant General Manager

DK/kv

Bozeman Fire Department

P.O. Box 610
Bozeman, Montana 59771-610

Phone (406) 582-2350

Fax (406) 582-2355

TDD (406) 582-2301

December 26, 1995

Keith Belden, P.E.
Morrison Mairele, Inc.
P.O. Box 1113
Bozeman, MT 59771


RE: Bridger Creek Subdivision - Phase 2 and 3.

Dear Keith:

I have reviewed the proposed development plans for the above referenced project and find that the Bozeman Fire Department will be able to service the proposed development provided water supply and hydrant spacing meet the minimum requirements of the Uniform Fire Code. As with any development, the water supply must be fully operational prior to any combustible construction being initiated.

Should you have any questions or comments, please contact me at your convenience.

Sincerely,



Chuck Winn
Deputy Chief/Fire Marshal

RECEIVED DEC 20 1995

Date: 19 DECEMBER 1995



Gallatin County Sheriff's Department

MEMO TO:

Keith S. Belden, P.E.
Morrison Maierle Inc.
P. O. Box 1113
Bozeman MT 59771-1113

FROM: Sheriff Slaughter

RE: Bridger Creek Subdivision - Phase 2 & 3

Dear Keith,

We received and have reviewed your request for services for the proposed Bridger Creek Subdivision - Phase 2 & 3.

We will be able to provide emergency services to this area.

As you are aware, one subdivision will not have much effect on crime or calls for service. However, when one considers all the growth in the county, we must expand our department to keep your services at the same levels.

We hope that when we request additional manpower and equipment in the future, you will support the Sheriff's Office.


Bill Slaughter, Sheriff

BS/ss

RECEIVED JAN 09 1996

Maintenance, Operations
and Support Services

Gary J. Griffith
Supervisor

Phone: (406) 585-1540
Fax: (406) 585-1504



404 West Main, P.O. Box 520
Bozeman, Montana 59771-0520

January 8, 1996

Keith S. Belden, P.E.
Morrison Maierle, Inc.
P.O. Box 1113
Bozeman, MT 59771

Re: Bridger Creek Subdivision, Phase 2 & 3

Dear Keith:

This letter is written in response to your letter of December 15, 1995 concerning Bridger Creek Subdivision, Phase 2 & 3.

Your letter stated that the Bridger Creek Subdivision, Phase 2 & 3, would have 95 housing units. It would therefore be expected to generate 48 K-12 students. Of these, 15 would be high school students, 11 would be middle school students, and 22 would be K-5 students.

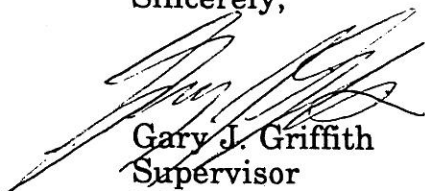
The chart below is a tabulation of our student capacity in the year 2000 and the expected enrollment with housing at the present level, with anticipated housing in subdivisions reviewed by this office, and Bridger Creek Subdivision, Phase 2 & 3, contribution to the overcrowding.

	Year 2000 Capacity	Proj. Yr. 2000 Enrollment w/Housing at Present Level	Proj. Yr. 2000 Enrollment w/Subdivisions 80% Occupied	Bridger Creek Subdv. Phase 2 & 3 Contribution to Overcrowding
K-5	2,450	2,205	2,675	18
MS	1,250	1,151	1,377	9
HS	<u>2,180</u>	<u>1,895</u>	<u>2,196</u>	<u>12</u>
	5,880	5,251	6,247	39

If it is assumed that 80% of Bridger Creek Subdivision, Phase 2 & 3, will have occupied housing units by the summer of the year 2000, and that all other subdivisions that have been reviewed by this office in the last 36 months will be occupied at the same level, then Bozeman School District elementary schools would be overcrowded by 9% or 275 students. In addition, the two middle schools would be overcrowded by 10% or 127 students. When a development rate of 38% is assumed instead of 80%, the district would be 100% full in the year 2000.

Bozeman School District presently has bus routes on Bridger Drive that can accommodate students from Bridger Creek Subdivision, Phase 2 & 3.

Sincerely,

A handwritten signature in black ink, appearing to read 'Gary J. Griffith', written over a light blue horizontal line.

Gary J. Griffith
Supervisor
Maintenance & Operations

GJG/kc