REQUEST FOR PROPOSALS

FOR

DESIGN AND ENGINEERING

SERVICES FOR

ARBANEY SWIMMING POOL PROJECT

TOWN OF

1901

June 7, 2019
REQUEST FOR PROPOSALS

TOWN OF BASALT
Design and Engineering Services for Arbaney Swimming Pool Project

June 7, 2019

The Town of Basalt is accepting proposals from a Swimming Pool Design and Engineering Firm or a combination of firms that can provide design and engineering services ("FIRM") necessary to design and prepare the bid documents for the Arbaney Pool Project. Sealed or electronic proposals (send to planning@basalt.net) will be received at the Town of Basalt, Basalt Town Hall, 101 Midland Avenue, Basalt, Colorado, 81621 until 4:00 pm (our clock), Tuesday, July 9, 2019. The proposals will not be publicly opened at this time.

The electronic Request for Proposals (RFP) plus appendix will be made available electronically starting on Friday, June 7, 2019 until the time that the proposals are due.

Interested firms should send an email to the Basalt Planning Department at planning@basalt.net. The email subject line should read: RFP — Design and Engineering Services for Arbaney Park and Pool Project. A pre-proposal meeting (non-mandatory) will be held at the Town of Basalt Town Hall, 101 Midland Avenue, Basalt, Colorado 81621, at 3:00 pm MDT on June 19, 2019. All firms intending to submit a proposal for the project are encouraged to have a representative at the pre-proposal meeting. The pre-proposal meeting will be filmed and available for review.

Questions about the meaning or intent of the RFP must be submitted by email to planning@basalt.net by Friday, July 5, 2019 (Pre-proposal deadline). Replies will be issued by Addenda emailed to all parties who have requested be notified of any Addenda prior to the Pre-proposal deadline. Questions received after the Pre-proposal deadline may not be answered. Only answers made by formal written Addenda will be binding.

This solicitation for proposals may be canceled by the Town, and proposal may be rejected in whole or in part for good cause when in the best interests of the Town. The Town reserves the right to reject any or all proposals or accept what is, in its judgment, the best proposal.

Published by order of the Town of Basalt
Susan Philp, Basalt Planning Director

RFP — Arbaney Park
Pool Project
REQUEST FOR PROPOSALS

DESIGN AND ENGINEERING SERVICES FOR ARBANEY SWIMMING POOL PROJECT

I. INTRODUCTION

The Town of Basalt (hereinafter “Town”) is seeking Proposals from interested and qualified Swimming Pool Design and Engineering Firm or a combination of firms that can provide design and engineering services (herein referred to as (“FIRM”) necessary to design and prepare the bid documents for the Arbaney Pool Improvements Project (hereinafter the “Project”). Engineering and design services are needed by the Town redesign the kiddie pool, review the dressing rooms, provide full Mechanical Electrical and Plumbing (MEP) design for pool and building and new bathrooms.

II. BACKGROUND

The project site is located to the north of the Basalt Middle School. The Town is improving the pool facilities as well as the park facilities over a multi-year period. The conceptual plan and phasing plan for the Arbaney Park Improvements are shown on Attachment A. The current project only includes work at or immediately adjacent to the pool facility and the remaining phases will be completed under separate RFPS in upcoming years. Construction of Phase I of the improvements is included in the Town’s adopted CIP for 2020. An excerpt from the Town’s adopted CIP is included in Attachment B.

The pool is one of the Town of Basalt’s largest consumers of gas and electricity for municipal-owned facilities. The Town has adopted a Climate Action Plan which has aggressive targets for reducing greenhouse gas emissions. As a result, objectives of this project include: using less fuel; using clean energy (which is electricity) where it make sense, and to be more energy and water efficient overall.

III. SCOPE OF WORK

A. The Engineering and Planning services and deliverables included in the Arbaney Pool Facility Project include:

1. Develop at least two conceptual options and cost estimates for enhanced kiddie pool including full design to construction drawings. Develop schematic design drawings to a level sufficient for establishing overall project cost and
budget with two options for kiddie pool area.
2. Provide full MEP design for outdated pool pumps and related mechanical equipment
3. Provide design and engineering to enhance pool changing rooms as described below.
4. Provide full MEP design for existing pool changing rooms and propose modest improvements for the boys and girls changing rooms as described below.
5. Evaluate feasibility of modifying pool building to provide a family friendly/restroom, most likely to be bid and constructed in a future phase.
6. Develop conceptual restroom design for the future Arbaney Park restrooms which will be adjacent to the pool fence but not part of the pool facility and will be accessed from Arbaney Park and not from the pool. These restrooms will be constructed in a subsequent phase.
7. Develop construction cost estimates for improvements for budgeting.
8. Develop bid level drawings and bid package for Phase I Construction.

Modest improvements are proposed for the boys and girls changing rooms including:
1. New lockers, updated faucets, soap dispensers.
2. Paint and new flooring.
3. Investigate plumbing to eliminate odors in men’s locker room associated with the sewer system

B. The public process included in the FIRM’s proposal at a minimum must include the following:

1. Kick-off meeting with staff. Review existing conditions on site with Town Staff.
2. Lead a charrette with the Parks, Open Space and Trails Committee (POST) and interested Basalt Town Council members.
3. Meet with Town Staff, Town of Basalt POST Committee, P&Z, and Basalt Town Council, as requested by Town Staff.
4. Have one Open House meeting open to the public where the two options for the kiddie pool are presented.

C. At the discretion of the Firm and if agreed to by Staff provide other services needed by the Town including management of bids and construction observation.
IV. MINIMUM QUALIFICATIONS

Respondents will be deemed non-responsive and rejected without any further evaluation if at least one member of the FIRM is not licensed as a Professional Engineer within the State of Colorado.

V. PROPOSALS: CONTENT AND FORMAT

A. The Proposal should include information in the format outlined in this RFP. Include concise, but complete information about your FIRM, emphasizing why your firm is qualified to provide engineering services for this Project. Shortlisted Firms may be required to make a formal presentation to the Town either in person or by skype. However, the Town reserves the right to request a presentation in person if necessary to arrive at a determination.

B. The Proposal should include the following:

1. Cover Letter: A cover letter containing the name, address, and daytime phone number(s) for the FIRM. The FIRM’s primary contact person shall be identified along with any individuals who will be authorized to act in behalf of the FIRM. The letter shall bear the signature of the person authorized to act as the legal agent of the FIRM.

2. Experience and Qualifications: A description of the experience and technical qualifications of the FIRM related to this Project, specifically the types of services described in the Scope of Work above. The proposal should address:
   - Professional background of key staff to be involved in this Project.
   - Technical expertise of the firm and, most specifically, those individuals who will be involved in this Project.
   - Location of all key staff involved in project.
   - Description of how the FIRM can address the green goals of this project. Attachment D contains the results of prior studies and inventory of energy use in the pool.

3. Relevant Experience and References: A list of several successfully completed projects applicable to this one.
   - Location of related projects.
   - Description and size (may include sketches, plans, photographs
from one or two projects most similar to the Town of Basalt’s project).

- Name and contact information for owner’s representative familiar with the project and the work completed by the Architect.
- Project budget and schedule status.

4. Schedule for Completion: A statement of staff and resources available to complete the Project within the anticipated schedule.

5. Scope of Services: A description of the services anticipated to be needed for this Project. The FIRM may simply refer to the work outlined above in this RFP, but FIRMS may choose to elaborate on the expertise or specialized skills anticipated to be needed to successfully complete the Project.

6. Cost for completing the services. Specify the costs to complete the elements included in the RFP by completing the table in Attachment C. It is likely that additional services will be needed by the Town which will not be included in the initial contract. Tasks not included in the initial contract will be authorized through additional services or on a time and materials basis. The Town currently has $50,000 budgeted for 2019 but has more monies available if needed.

VI. SUBMITTAL DEADLINE

Sealed or electronic proposals must be received by 4:00 PM MST, July 9, 2019 at the Basalt Town Hall, 101 Midland Avenue, Basalt, CO, 81621. Electronic proposals may be sent to planning@basalt.net by the proposal deadline.

VII. SUBMITTAL PROCESS

Respondents, who submit sealed proposals, shall submit one original and two copies of their Proposals as outlined in this RFP. Proposals must be clearly marked either on the envelope or email subject line:

“PROPOSAL DESIGN AND ENGINEERING SERVICES FOR ARBANEY SWIMMING POOL PROJECT”
Until the Proposal deadline all Proposals shall remain confidential. After the Proposal Deadline, documents submitted and not withdrawn prior to the submittal deadline may be reviewed by the public. All documents shall become the property of the Town.

The FIRM may include a flash drive or CD containing a digital version of the proposal in the sealed envelope.

VIII. SELECTION PROCESS

The Town will review the Proposals based on the information provided in the proposal and in the interview and will select the FIRM they determine to be most qualified for the Project. The Town may request additional information or interviews at its discretion. The Town shall have the sole authority to determine qualifications and final selection of FIRM.

The selection process will be based on the following:

i. Skill level demonstrated by the FIRM as determined necessary to complete the project

ii. Expected price for each element and ability of the FIRM to contain costs to reasonable expectations

iii. Understanding of the goals of the project – particularly advancing the sustainability objectives.

iv. Ability to follow instructions included in the RFP

v. Availability of the FIRM to meet the time demands of the project

vi. Quality of response

This solicitation for proposals may be canceled by the Town, and proposal may be rejected in whole or in part for good cause when in the best interests of the Town. The Town reserves the right to reject any or all proposals or accept what is, in its judgment, the best proposal.
IX. TIME SCHEDULE

The following is an estimated timetable for the selection processes for this request. Dates included in the published Request for Proposals as shown below in red bold type are set deadlines. Other dates below are expected to be the final dates based on past practices but may change depending on specific circumstances.

**Friday, June 7, 2019:** Request for Proposals is made publicly available.

**Wednesday, June 19, 2019 at 3:00 pm:** Pre-proposal meeting at Town Hall at 3:00 pm. The meeting will be filmed and may be accessed through Community Grass Roots Community Network (http://www.grassrootstv.org) – go to Government|Town of Basalt|Planning and Zoning.

**Friday, July 5, 2019:** Pre-proposal question deadline

**Tuesday, July 9, 2019:** PROPOSALS MUST BE RECEIVED BY 4:00 PM, MST

**Monday, July 15, 2019:** Tentative - a shortlisted group of FIRMS could potentially be interviewed at Town Hall starting at 2:00 pm. Mandatory in person or Skype.

**Wednesday, July 17, 2019:** By this date FIRM would be selected subject to Council approval and notified.

**Tuesday, July 23, 2019:** Contract to be scheduled for approval by Basalt Town Council

**Wednesday, July 24, 2019:** Notice to proceed

**Wednesday, August 21, 2019:** Tentative date for Charrette. The Designer as part of the FIRM will have the major role in this meeting, but it is important for Engineer to have a representation at this meeting

**Tuesday, October 1, 2019:** Staff’s Packet deadline for October 8th meeting. By this date all materials will have needed to be accepted by Staff to show the Town Council.

**Tuesday, October 8, 2019:** The FIRM will present the recommended plan to the Town Council.

**Tuesday, October 22, 2019:** Deadline for cost estimate submitted for inclusion in 2019 budget.
X. QUESTIONS REGARDING THE RFP

Question about the meaning or intent of the RFP must be submitted by email to planning@basalt.net by Friday, July 5, 2019 ("Pre-proposal deadline"). Replies will be issued by Addenda email to all parties who have requested be notified prior to the Pre-proposal deadline to be included on the Town’s email list. Questions received after the Pre-proposal deadline may not be answered. Only answers made by formal written Addenda will be binding.

If the Town receives questions of significant consequence at the Pre-Proposal meeting, we intent to submit an addendum before the Pre-proposal deadline.

List of Attachments

A. Arbaney Park Conceptual Plan and Phasing Plan
B. Excerpt from adopted CIP
C. Cost for Services
D. Prior Analysis of Pool
E. Condition Maps
Attachment A

Arbaney Park Conceptual Plan and Phasing Plan
Note: The Town currently has $50,000 budgeted for 2019 but has more monies available if needed.
Town of Basalt
5 Year Capital Improvement Plan - POST
Option 2019 - Purchase Park & Arbaney
12/7/2018

POST = Parks, Open Space, and Trails

<table>
<thead>
<tr>
<th>Department</th>
<th>Project Description</th>
<th>Total 5 Yr. Cost (19-23)</th>
<th>Source</th>
<th>Projection 2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ESTIMATED Beginning Carryover POST</td>
<td>$1,170,393</td>
<td>$1,584,516</td>
<td>$146,934</td>
<td>$56,934</td>
<td>$56,934</td>
<td>$86,934</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>POST Revenue ESTIMATE per Year</td>
<td>1,754,607</td>
<td>1,853,547</td>
<td>1,800,000</td>
<td>1,800,000</td>
<td>1,800,000</td>
<td>1,800,000</td>
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<tr>
<td></td>
<td>Other Sources Revenue Used (See below, 2019)</td>
<td>87,000</td>
<td>625,000</td>
<td>100,000</td>
<td>180,000</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL AVAILABLE FUNDING</td>
<td>3,012,000</td>
<td>4,063,063</td>
<td>2,046,934</td>
<td>2,036,934</td>
<td>1,856,934</td>
<td>1,886,934</td>
<td></td>
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</tr>
</tbody>
</table>

**LESS, EXPENSES:**

| A | Open Space | Underpass at Basalt Avenue | $1,350,000 | POST/ LOC | $650,000 | $1,350,000 | - | - | - | - |
| A2 | Underpass Interest | - | POST | 57,292 | - | - | - | - | - |
| A3 | Underpass Complete Project | - | 100,013 | - | - | - | - | - | - |
| B | Open Space | Two Rivers Road Trail /Pedestrian Improvements NOTE A | 335,420 | POST | 285,420 | 50,000 | - | - | - | - |
| C | Open Space | Old Pond Park | 20,000 | POST | 200,118 | 20,000 | - | - | - | - |
| D | Open Space | Lions Park | - | POST | - | - | - | - | - | - |
| E | Open Space | Basalt River Park Purchase | 1,600,000 | POST | - | 1,600,000 | - | - | - | - |
| F | Open Space | Basalt River Park Improvement | 1,100,000 | POST | - | 50,000 | 750,000 | 300,000 | - | - |
| G | Open Space | Midland Park - Phase II could includes Skateboard park upgrades | 20,000 | POST | 7,063 | 10,000 | - | 10,000 | - | - |
| H | Open Space | Confluence Park & Emma Bridge | - | POST | - | - | - | - | - | - |
| I | Open Space | Willits Area Parks (Linear Park & Parcel 10) | 320,000 | POST | 13,110 | 20,000 | - | 100,000 | 100,000 | 100,000 |
| J | Open Space | Ponderosa Park | 75,000 | POST | - | 50,000 | 25,000 | - | - | - |
| K | Open Space | Trails - Mid Valley Center, Trails to Public Lands | 770,000 | POST | - | 20,000 | 50,000 | 100,000 | 300,000 | 300,000 |

*SEE PAGE 2*
# Town of Basalt

## 5 Year Capital Improvement Plan - POST

**Option 2019 - Purchase Park & Arbaney**  
**12/7/2018**

**POST = Parks, Open Space, and Trails**

<table>
<thead>
<tr>
<th>Department</th>
<th>Project</th>
<th>Total 5 Yr. Cost (19-23)</th>
<th>Source</th>
<th>Projection 2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
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<tr>
<td>L</td>
<td>Open Space Park Purchase</td>
<td>400,000</td>
<td>POST</td>
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<td>200,000</td>
<td>200,000</td>
<td></td>
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<tr>
<td>M</td>
<td>Open Space Whitewater Park</td>
<td>80,000</td>
<td>POST</td>
<td>40,000</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
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<tr>
<td>N</td>
<td>Open Space Arbaney Park</td>
<td>2,075,000</td>
<td>POST</td>
<td>-</td>
<td>50,000</td>
<td>475,000</td>
<td>350,000</td>
<td>600,000</td>
<td>600,000</td>
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<tr>
<td>O</td>
<td>Open Space Southside Drive/Flou Lane Trail Connection</td>
<td>-</td>
<td>POST</td>
<td>-</td>
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<tr>
<td>P</td>
<td>Open Space Two Rivers Road Trail - Midland to CDC Dev</td>
<td>300,000</td>
<td>POST</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>150,000</td>
<td>150,000</td>
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<tr>
<td>Q</td>
<td>Open Space Misc. Projects</td>
<td>430,000</td>
<td>POST</td>
<td>49,887</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
<td>200,000</td>
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<tr>
<td>R</td>
<td>Open Space Memorial Recognition (Giving Garden)</td>
<td>200,000</td>
<td>POST</td>
<td>-</td>
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<td>100,000</td>
<td>100,000</td>
<td>-</td>
<td>-</td>
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<tr>
<td>S</td>
<td>Open Space Gun Range Improvements</td>
<td>550,000</td>
<td>POST (requires match funds)</td>
<td>-</td>
<td>50,000</td>
<td>-</td>
<td>500,000</td>
<td>-</td>
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<tr>
<td>T</td>
<td>Open Space Park Signs</td>
<td>-</td>
<td>POST</td>
<td>-</td>
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<td>-</td>
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</tr>
<tr>
<td>Open Space</td>
<td>open Space Parks Maintenance NOTE B</td>
<td>1,810,709</td>
<td>POST</td>
<td>-</td>
<td>350,000</td>
<td>370,709</td>
<td>360,000</td>
<td>360,000</td>
<td>360,000</td>
</tr>
<tr>
<td>Total Capital Cost of POST Projects NOTE B</td>
<td></td>
<td>9,625,420</td>
<td>1,077,484</td>
<td>3,545,420</td>
<td>1,630,000</td>
<td>1,620,000</td>
<td>1,410,000</td>
<td>1,420,000</td>
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<tr>
<td>Total Cost with Maintenance ESTIMATED Ending Carryover POST, including other revenue</td>
<td>$ 11,436,129</td>
<td>1,427,484</td>
<td>3,916,129</td>
<td>1,990,000</td>
<td>1,980,000</td>
<td>1,770,000</td>
<td>1,780,000</td>
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<tr>
<td>ESTIMATED Ending Carryover POST, including other revenue</td>
<td>$ 1,584,516</td>
<td>$ 146,934</td>
<td>$ 56,934</td>
<td>$ 56,934</td>
<td>$ 86,934</td>
<td>$ 106,934</td>
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</table>
Town of Basalt
5 Year Capital Improvement Plan - POST
Option 2019 - Purchase Park & Arbaney
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<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
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<tr>
<td>1% POST</td>
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<td>1,853,547</td>
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<td>RFC RETA</td>
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<td>250,000</td>
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<tr>
<td>Park Impact Fee</td>
<td></td>
<td>350,000</td>
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<tr>
<td>Conservation Trust</td>
<td>Fund</td>
<td>25,000 (Gun Range)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>Enhancement Fund</td>
<td>25,000 Year 2018</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>SM Payment</td>
<td></td>
<td>87,000 Year 2018</td>
<td></td>
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<tr>
<td>Carryover</td>
<td></td>
<td>1,472,516 (Excl. SM Payment 2018)</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>4,063,063 * Doesn't include any County Funds or Grants</td>
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</table>

NOTE A: The Town Manager would like to make Two Rivers Road Sidewalk connection from Old Pond Park to Spring Creek Bridge.

NOTE B: Total Capital Cost doesn't include Park Maintenance.
### Attachment C
#### Cost for Services

Firms are asked to specify the costs to complete the by filling in this table

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>A-1</td>
<td>Price for Design and Engineering services not including price to prepare bid documents</td>
<td></td>
</tr>
<tr>
<td>A-2</td>
<td>Price to prepare bid documents</td>
<td></td>
</tr>
<tr>
<td>B-1</td>
<td>Price for project set up and kick off meeting with Staff</td>
<td></td>
</tr>
<tr>
<td>B-2</td>
<td>Price for leading a charrette with the Parks, Open Space and Trails Committee (POST) and interested Basalt Town Council members. Assume Charette is 3 hours.</td>
<td></td>
</tr>
<tr>
<td>B-3</td>
<td>Price for Public Open House</td>
<td></td>
</tr>
<tr>
<td>B-4</td>
<td>Price for each additional meeting with Town Staff not included in the FIRM’s base proposal</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL COST FOR BASE PROPOSAL SERVICES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-5</td>
<td>Price for each additional meeting with Town Staff not included in the FIRM’s base proposal</td>
<td></td>
</tr>
<tr>
<td>B-6</td>
<td>Price for each additional meeting with a Town Board not included in the FIRM’s base price</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>At the discretion of the Town and if agreed to by the FIRM, provide other design and engineering services related to the project, including management of bids and construction observation</td>
<td>Include hourly rates of key individual involved in the project</td>
</tr>
</tbody>
</table>

**Notes:**

1. FIRMS should be as specific as possible about what is included in the base proposal price.
2. Price should include packet preparation, preparation of any PowerPoint and travel.
3. FIRM needs to be clear as to the pricing structure, e.g. whether the contract will be based on hourly rates with a maximum price for specific elements or a lump sum fee based on specific tasks.
4. It is likely that additional services will be needed by the Town which will not be included in the initial contract.
5. In developing costs for services assume the following:
   - Conceptual Plans are substantially as shown on the attachments.
   - The Town Engineer will develop the design and cost estimate for the water line improvement.
Attachment D
Prior Analysis of Pool

Includes:

1. Meeting Notes 3-21-2019 Meeting on Energy Improvements at Basalt Pool including Town Staff, and representatives from CORE and Holy Cross
2. Data on Energy Use of the Pool
3. Heliocol Certificate
4. Excerpts from Energy Assessment for the Town of Basalt
5. Emails regarding solar
6. Photos
Energy Improvements at Basalt Pool
Meeting Date & Time: March 21, 2019
Meeting Attendees: Susan Philp, Sara Nadolny, Rob Larson, Marty Treadway, Sarah Gruen, Mary Weiner

Recommendations:
1. Engineering study for a holistic review of the pool heating system and circulation pumps; consider working with Tony from SGM
2. Evaluate VFDs for circulation pumps
3. Evaluate solar thermal system expansion or buffer tank
4. Continue to explore solar PV on the locker rooms

Evaluate the pool circulation pumps
- A variable frequency drive (VFD) could be installed to control pump motor speed -- instead of running at a constant speed, VFDs vary the frequency supplied to the motor to match need
- Consider installation of new energy efficient motors
- Consider costs to upgrade electrical systems (run on 110)

Evaluate solar thermal system
- The current solar thermal system is likely less efficient than an evacuated tube system; consider upgrading the panels. If the panels are upgraded, try to use the existing framing.
- Consider expanding the system to increase solar thermal capacity to preheat a greater amount of pool water. With a larger solar thermal system, when it is time to replace the boiler, a smaller boiler could be installed.
- Explore how a buffer tank could store and pre-feed the system (like tanks at Marble Distillery)

Current Conditions:
The major components at the Basalt pool include: pool, baby pool, locker room and snack bar, mechanical room, and solar thermal array.
- Initial construction: 1992; minor improvements since (including the solar thermal system)
- Operating season: three months during the summer (from Memorial Day weekend through August)
- The pool complex is the town’s single greatest energy user
- Pool:
  - 220,000 gallons
  - Heated to 86-88 degrees in the summer (warm enough for morning lap swimmers)
  - The pool is not drained in the winter due to the small size of pipes; about 2-2.5” line connecting to the pool. The boiler is turned off on the last day of the season and does not supply heat to the pool in the winter. One circulation pump remains on.
- Pumps: there are 2-7.5 HSP pumps and 1 smaller
  - 1-7.5 HSP pump running 24/7 in the winter
  - 2-7.5 HSP pumps running 24/7 in the summer
- The boiler is not the original. Estimate it is a 1,200,000 BTU/hr boiler.
- Two pool covers; one for the summer, one for the winter. An insulated cover is placed over the pool nightly in the summertime.

- Baby pool:
  - 600 gallons; served by pumps mentioned above

- Locker rooms:
  - 6 showers in the men's room; 6 in the women's (total of 12) as well as toilets
  - 2 natural gas water heaters; last year, Rob discovered he could use 1-75 gallon water heater effectively, instead of two
  - The locker rooms are heated to 70 degrees in the summer by radiant heat from a small boiler
  - Green Team has funds budgeted for the installation of a 7 kW solar PV system on the locker room roof in 2019

- Solar thermal system:
  - Installed in 2013 by Mike Tierney (Aspen Solar)
  - Pre-heats the water; heated water then covers a portion of the pool heating need, and therefore reduces the amount of energy used by the boiler
  - Unglazed flat plate system that consists of 11 collectors, harvesting an estimated 517,000 BTU's per day of operation
  - Anecdotally, Rob mentioned that there are warm days where the boiler doesn't need to fire on

Arbaney Park Improvement Plan:
- 2019: planning, engineering, design and the creation of bid documents
- 2020: begin phased improvements
- Improvements include aesthetic improvements of the fence; create a larger, walk-in baby pool upgrades; shade sails; modest locker room improvements; a new family-friendly restroom facility that can be accessed from the park; lengthening the solar thermal array over new restrooms
# Data on Energy Use of Pool

## Basalt Pool Energy Data

Last updated: 3/2019

Address: 600 Elk Run, Basalt Colorado

Utility information:
Black Hills Account Number: 1101248985
Holy Cross Energy Account Number: 447588800

### NATURAL GAS

Avg annual usage (therms):

<table>
<thead>
<tr>
<th>Year</th>
<th>Payment (Therms)</th>
<th>MMBTU/</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>99,742</td>
<td>9,864</td>
<td>34</td>
<td>654</td>
<td>571</td>
<td>215</td>
<td>179</td>
<td>2,606</td>
<td>1,906</td>
<td>1,262</td>
<td>1,228</td>
<td>36</td>
<td>145</td>
<td>523</td>
</tr>
<tr>
<td>2015</td>
<td>99,625</td>
<td>10,275</td>
<td>37</td>
<td>734</td>
<td>610</td>
<td>386</td>
<td>281</td>
<td>498</td>
<td>2,367</td>
<td>1,794</td>
<td>1,670</td>
<td>154</td>
<td>51</td>
<td>302</td>
</tr>
<tr>
<td>2016</td>
<td>99,285</td>
<td>9,696</td>
<td>33</td>
<td>627</td>
<td>435</td>
<td>414</td>
<td>158</td>
<td>558</td>
<td>1,667</td>
<td>1,701</td>
<td>1,966</td>
<td>2,037</td>
<td>90</td>
<td>122</td>
</tr>
<tr>
<td>2017</td>
<td>99,285</td>
<td>9,696</td>
<td>33</td>
<td>548</td>
<td>447</td>
<td>400</td>
<td>136</td>
<td>296</td>
<td>1,345</td>
<td>1,604</td>
<td>1,376</td>
<td>1,717</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ELECTRIC

Avg annual usage (kWh):

<table>
<thead>
<tr>
<th>Year</th>
<th>Payment (kWh)</th>
<th>(MMBTU)</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>99,961.07</td>
<td>87,292</td>
<td>290</td>
<td>11,915</td>
<td>9,861</td>
<td>3,858</td>
<td>540</td>
<td>5,675</td>
<td>12,495</td>
<td>13,086</td>
<td>12,148</td>
<td>6,487</td>
<td>450</td>
<td>2,263</td>
</tr>
<tr>
<td>2015</td>
<td>101,095</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>104,791</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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# Heliocol Certificate

**SUPPLIER:**
LAMA Solar
650 Sunshine Lane
Altamonte Springs, FL 32714 USA
www.lamasolar.com
In Accordance with:
SRCC Standard 100-2013-01

**CERTIFIED SOLAR COLLECTOR**

<table>
<thead>
<tr>
<th>BRAND:</th>
<th>Heliocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODEL:</td>
<td>HC</td>
</tr>
<tr>
<td>COLLECTOR TYPE:</td>
<td>Unglazed Flat Plate</td>
</tr>
<tr>
<td>CERTIFICATION #:</td>
<td>10001884</td>
</tr>
<tr>
<td>Original Certification:</td>
<td>November 13, 2013</td>
</tr>
<tr>
<td>Expiration Date:</td>
<td>October 08, 2026</td>
</tr>
</tbody>
</table>

The solar collector listed below has been evaluated by the Solar Rating & Certification Corporation™ (SRCC™), an ANSI accredited and EPA recognized Certification Body, in accordance with SRCC OG-100, Operating Guidelines and Minimum Standards for Certifying Solar Collectors, and has been certified by the SRCC. This award of certification is subject to all terms and conditions of the Program Agreement and the documents incorporated therein by reference. This document must be reproduced in its entirety.

## COLLECTOR THERMAL PERFORMANCE RATING (Collector Tested per ISO 9806)

<table>
<thead>
<tr>
<th>Climate Category (Ti-Ta)</th>
<th>High Radiation (6.3 kWh/m².day)</th>
<th>Medium Radiation (4.7 kWh/m².day)</th>
<th>Low Radiation (3.1 kWh/m².day)</th>
<th>Climate Category (Ti-Ta)</th>
<th>High Radiation (2000 Btu/hr./ft².day)</th>
<th>Medium Radiation (1500 Btu/hr./ft².day)</th>
<th>Low Radiation (1000 Btu/hr./ft².day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (-5 °C)</td>
<td>6.5</td>
<td>5.1</td>
<td>3.7</td>
<td>A (-9 °F)</td>
<td>2.1</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td>B (5 °C)</td>
<td>3.3</td>
<td>2.0</td>
<td>0.8</td>
<td>B (9 °F)</td>
<td>1.0</td>
<td>0.8</td>
<td>0.2</td>
</tr>
<tr>
<td>C (20 °C)</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>C (36 °F)</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>D (50 °C)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>D (90 °F)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

A: Pool Heating (Warm Climate)  B: Pool Heating (Cool Climate)  C: Water Heating (Warm Climate)  D: Space & Water Heating (Cool Climate)  E: Commercial Hot Water & Cooling

## COLLECTOR SPECIFICATIONS

<table>
<thead>
<tr>
<th>Gross Area:</th>
<th>2,244 m²</th>
<th>24.15 ft²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Aperture Area:</td>
<td>2,244 m²</td>
<td>24.15 ft²</td>
</tr>
<tr>
<td>Absorber Area:</td>
<td>2,244 m²</td>
<td>24.15 ft²</td>
</tr>
</tbody>
</table>

| Dry Weight: | 5 kg | 11 lb |
| Fluid Capacity: | 7.2 liter | 1.9 gal |
| Test Pressure: | 1103 kPa | 160 psi |

## TECHNICAL INFORMATION

**ISO Efficiency Equation** [NOTE: Based on gross area and (Pt*Ti-Ta)]

### SI UNITS:

\[
\eta = \frac{0.905(1 - 0.0483u) - (11.92716 + 14.2560u)(Pt*Ti-Ta)}{u}
\]

### IP UNITS:

\[
\eta = \frac{0.905(1 - 0.0206u) - (2.1084 + 1.1254u)(Pt*Ti-Ta)}{u}
\]

<table>
<thead>
<tr>
<th>Incident Angle Modifier</th>
<th>Test Fluid:</th>
<th>Test Mass Flow Rate:</th>
<th>Water</th>
<th>0.0997 g/s (m³/min)</th>
<th>72.78 lb/hr (ft²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.00</td>
<td>1.02</td>
<td>1.04</td>
<td>1.07</td>
<td>1.08</td>
</tr>
<tr>
<td>Kta</td>
<td>1.00</td>
<td>1.02</td>
<td>1.04</td>
<td>1.07</td>
<td>1.08</td>
</tr>
</tbody>
</table>

**REMARKS:** All sizes of this collector are certified.

---

Technical Director

Print Date: November, 2013 Page 1 of 1
© Solar Rating & Certification Corporation™
www.solar-rating.org  ♦  400 High Point Drive, Suite 400 ♦  Cocoa, Florida 32926 ♦  (321) 213-6037 ♦  Fax (321) 821-0910

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4. Excerpts from Energy Assessment

Energy assessment for the Town of Basalt

Properties:
Art Base & Planning Department
Town Hall
Basalt Pool
Public Works Office
Public Works Garage

Assessment performed: May 4, 2017

Performed by:
Brad Davis
Energy Programs Manager, CORE
BPI Building Analyst
Brad@aspencore.org

Marty Treadway
Program Director, CORE
M. Arch., BPI BA, C.E.M
Marty@aspencore.org
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About the Assessment
This walk-through energy assessment is intended to guide energy efficiency upgrade projects, and to determine where further energy analysis might be useful in the future. This information can be used to prioritize projects that will reduce operating expenses, save energy, and increase occupant comfort levels.

A review of existing mechanical systems and control was evaluated during the walk-through. Lighting was excluded from this evaluation as the lighting in all of the town’s buildings will be upgraded to LED in the summer of 2017. Boyd Bierbaum guided the site visit and provided background on how the facilities are typically used, and how they typically perform.

Disclaimer
CORE staff is not responsible for missing any hazardous conditions on your properties. This walk-through assessment is meant to help stakeholders become aware of energy savings and financial opportunities available for these buildings.

Building Assessment Summary
In March 2017, the Town of Basalt approved the Basalt Climate Action Plan to reduce greenhouse gas emissions 25% by 2025 and 80% by 2050 as compared to a 2014 baseline. Improving the energy efficiency of the town-owned buildings was identified as a key step towards reaching those climate targets. As such, CORE was asked to conduct an energy assessment for the primary town buildings.

The following report summarizing the findings and makes specific recommendations for the Art Base & planning department offices, Town Hall, Basalt Pool, Public Works office and Public Works garage. The most pressing opportunities found should be prioritized as follows:

1. Explore options for reducing runtime and efficiency of pool pump systems (pg. 13)
2. Expand capacity of solar thermal preheat for pool boiler (pg. 13)
3. Optimize the mechanical systems in the public works garage (pg. 19)

Using the information in this report, an implementation strategy should be developed to reflect priorities. Under the implementation strategy, project costs, energy savings, and cost payback analysis should be developed.
Energy Consumption:

As part of the energy assessment, utility data was analyzed to better understand how energy is used, and how it that energy impacts your utility bill. When performing an energy assessment, multiple years of utility data are generally included to better evaluate trends and seasonal patterns. Table 1 shows one year of baseline data (2014). At the time of writing no other data was available.

Table 1: Baseline utility data (2014)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Annual Consumption (kWh)</th>
<th>Annual Consumption (therm)</th>
<th>Annual Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Base</td>
<td>22,858</td>
<td>2,292</td>
<td>$4,973</td>
</tr>
<tr>
<td>Town Hall</td>
<td>30,612</td>
<td>2,375</td>
<td>$6,004</td>
</tr>
<tr>
<td>Pool</td>
<td>87,292</td>
<td>9,864</td>
<td>$18,123</td>
</tr>
<tr>
<td>Public Works (office &amp; garage)</td>
<td>7,041</td>
<td>4,003</td>
<td>$5,262</td>
</tr>
</tbody>
</table>

Table 1 is a comparison of utility energy use among the five different facilities evaluated. The Public Works office and garage were evaluated separately, but included as one item here due to the shared electric meter. Annual electricity and gas use for the buildings is shown in the following chapters, this chart is a reference summary.
Basalt Pool Assessment

Building Information

Address: 600 Elk Run, Basalt

Date of Construction: 2004

Operating Hours: the pool is open to the public for three months during the summer (from Memorial Day weekend through August).

Heating System: 1,200,000 BTU/hr boiler with a solar thermal pre-heat

General Comments:

In 2014, the Basalt pool was the single greatest energy user (117 MTCO2e, or 87,292 kWh and 9,864 therms). Correspondingly, the pool also had the single greatest utility bill cost, at $18,123.

This system consists of a solar thermal system that preheats the hot water. This heated water covers a portion of the pool heating need, and therefore reduces the amount of energy used by the boiler, and therefore the costs of heating. This system was installed in 2013 and is an unglazed flat plate system with 11 collectors that harvest 265,650 BTU’s per day of operation.

Energy Usage Profile

Electric:

- Annual Usage: 87,292 kWh
- Monthly Average: 7,274 kWh

Natural Gas:

- Annual Usage: 9,864 Therms
- Monthly Average: 822 Therms
Annual Electrical Usage
Basalt Pool
2014: 87,292 kWh

Annual Gas Usage
Basalt Pool
2014: 9,864 Therms
## Basalt Pool Recommendations

<table>
<thead>
<tr>
<th>Existing Energy Infrastructure</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Increase solar thermal capacity</strong></td>
<td>Explore expand the system to increase solar thermal capacity. Greater capacity would allow solar energy to pre-heat a greater amount of pool water. The roof space above the dressing rooms is considered unable to hold the weight of additional panels. Additional areas should be considered, including the mechanical room roof.</td>
</tr>
<tr>
<td><strong>Replace the current solar thermal system</strong></td>
<td>The current solar thermal system is old (installed around 2009). It is likely less efficient than an evacuated tube or flat plate system.</td>
</tr>
<tr>
<td><strong>Evaluate pool circulation pumps</strong></td>
<td>One of the two circulation pumps are running 24/7 all year long. This operating schedule is likely unnecessary.</td>
</tr>
<tr>
<td></td>
<td>A variable-frequency drive (VFD) could be installed to control the pump motor speed so that pumps</td>
</tr>
<tr>
<td></td>
<td>New energy efficient motors could be installed, such as NEMA Premium.</td>
</tr>
</tbody>
</table>

Figure 1 – Solar thermal system.
Rebates & Financing

CORE staff can connect you with resources, cash-back rebates and financing for projects. Please consider giving us a call at (970) 925-9775 for assistance with these incentives, and for help with scoping your upgrade projects to maximize savings and ROI's.

To get further information on incentives please visit the links below.

- CORE's grant program: [http://aspencore.org/apply-for-grants/grants_overview/](http://aspencore.org/apply-for-grants/grants_overview/)
- Black Hills rebates vary month by month, for most current rebate opportunities see: [https://www.blackhillsenergy.com/save-money-energy/rebate-information](https://www.blackhillsenergy.com/save-money-energy/rebate-information)
- Holy Cross Energy rebates opportunities are listed here: [https://www.holycross.com/efficiency-commercial](https://www.holycross.com/efficiency-commercial)
aspen solar
3 messages

Gerry <grterwilliger@gmail.com>  
To: Sarah Gruen <sarah@aspencore.org>  
Cc: mike@aspensolar.com, Susan Philip <susan.phip@basalt.net>  

Wed, Jul 19, 2017 at 5:14 PM

Sarah,

Here is the analysis from Aspen Solar. There are two pages, but out of sequence, I am just getting used to my new printer.

 Basically, one panel produces 47,000 Btu/day and there are 11 panels installed for a 517,000 Btu/day total, twice what CORE indicated. If you assume that these panels provide heat for 90 days during the swimming season, then they generate 4.65X10+7 Btu/season.

The area of these panels is approximately the same as the area on the south facing building which is being considered for PVs and Sunsense calculated that they would generate 11,526 Kwhr per year, which is the equivalent of 3.94X10+7 Btu.

Therefore the thermal panels are outproducing the PVs, assuming these numbers are correct and that there are no other losses which need to be considered.

I’ll be interested to hear what your colleague has to say when he gets back into the groove.

Gerry
Gerald R. Terwilliger
grterwilliger@gmail.com
PO Box 2839
Basalt, CO 81621
(970)927-4629
(970)319-5959

"One must imagine Sisyphus happy" – Albert Camus
Basalt Pool Solar Analysis Report

September 24, 2007

To: Gerry Terwilliger
From: Mike Tierney

Gas Usage information

Information from Source Gas:

<table>
<thead>
<tr>
<th>Month</th>
<th>Usage</th>
<th>Therms</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>May (06)</td>
<td>1114</td>
<td>$2591</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>2670</td>
<td>$2010</td>
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</tr>
<tr>
<td>June</td>
<td>812</td>
<td>$1118</td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>779</td>
<td>$1073</td>
<td></td>
</tr>
<tr>
<td>August 06</td>
<td>659</td>
<td>$1536</td>
<td></td>
</tr>
</tbody>
</table>

This information suggests that an average of around 775 Therms per month are used once the pool is brought up to temperature. May usage is always high and depending on gas cost, can be very expensive. May 06 used less than half of the therms of May 07, but May 06 average therm cost was $2.30 and May 07 was $.75. If gas rate in 07’ were the same as 06’, the bill would have been over $6,000 dollars, ouch!

Solar system production

A solar panel made by Heliocol, at 4’ x 12’, will produce approximately 47,000 Btu’s/day in our climate.

Comparison numbers

If the pool gas usage averages 775 therms per month, then a per day figure, (30 day cycle) will be 26 therms per day of gas. A therm of gas is approximately 100,000 Btu’s. Therefore, the gas usage per day is 2,600,000 Btu’s. Of course that is what goes through the gas meter, but what comes out is at best 85% of that as usable heat, due to boiler inefficiencies. Therefore 2,600,000 Btu’s/day x 85% = 2,210,000 Btu’s/day usable heat. We divide 2,210,000 Btu’s/day by 47,000 Btu’s/day solar collected= 47 solar collectors to provide 100% of heating requirements per day.
Comparison numbers continued

(47) Heliocol 4' x 12' solar collectors = approx. 2,210,000 Btu's/day
Each collector = 48sqft, therefore 47 x 48sqft = 2,256sqft of solar collector. This is a
LARGE area of collector. The Basalt pool does not have enough roof surface area for
this, so Ground mounting the solar array is the next option. There is approximately 45' of
fence from the pool mech room to the sidewalk to the east, on the north side of the
facility. A structure could be built quite easily, and aesthetically pleasing, to mount solar
collectors onto from the fence northward. A new fence would then be placed north of the
array, which would still be in front of the bathroom building.
The structure could be built to hold one row of collectors nicely; a second row would
have to have its own structure, in my opinion. Therefore we could fit (11-12) collectors
across the structure (east to west). That would be 11 collectors x 47,000 Btu's/day =
517,000 Btu's/day total.
2,210,000 Btu's/day gas divided by 517,000 Btu's/day solar = approximately 24% of
pool heat provided by solar energy.
If two rows of solar collectors were installed, then the solar energy production would be
double the 24% or approximately 48% of pool heat provided by solar energy.

Solar system design

#1 - (11) Heliocol 4' x 12' solar collectors mounted onto a structure. Structure angle to
be approximately 30 – 35 degree’s off of horizontal. A motorized valve will be located on
the copper pipe in the mechanical room, and will be controlled by a microprocessor based
differential controller. This controller will determine when the flow will go through the
solar array, i.e. when the solar array is warmer than the return swimming pool water. Pool
water will flow through the array until the differential is no longer available, or the pool
high limit setting is enabled. Solar array is winterized when the pool is winterized. A Btu
meter will be installed on solar array to log energy collected by solar system. This is a
direct system, no heat exchanger is required, and the pool water is heated directly.

#2 – A second row of solar collectors can be installed. Same design and function as
System #1. Solar energy production will be twice what #1 is.

#3 – (3) Heliodyne 4’ x 8’ solar collectors mounted onto roof of main building. This
system will heat domestic hot water for showers during the pool season, and help with
space heating in the winter. This system will be a drainback system, a much simpler,
more efficient solar operating system.
Mike Tierney <mike@aspensolar.com>  Thu, Jul 20, 2017 at 7:46 AM
To: Gerry <grterwilliger@gmail.com>, Sarah Gruen <sarah@aspencore.org>
Cc: Susan Philp <susan.philp@basalt.net>

Good Morning all,

Here is what I know;

Existing surface area of array = ~528 sqft
PV @ 335 watt/module = approximate 10 kW system
PV watts report show 16,063 kWhrs/yr produced with premium modules at 10kW system size

Assume 365 day/year  16,063 / 365 = 44 kWhrs/day produced by PV

Solar thermal direct pool system
SRCC rating 3.3 kWhrs/sqmeter per day
There are 49 sq meters in 528 sq feet

3.3 kWhrs/sqmeter x 49sq meters = 161.7 kWhrs/day produced by thermal
x 90 days of pool operation = 14,553 kwhrs/year by thermal

In conclusion, Solar thermal in this application , (and most) will produce more kWhrs/sq meter than PV. But, because this solar thermal application is only utilized part time of the year, the total energy produced for the year will be more with PV. In this example it appears only by 11%.

Will the extra cost to retrofit pay for that 11% saving. Solar thermal for direct pool heating is the most efficient solar application. Will Holy Cross allow net metering in the future? Or will Basalt have to purchase storage, (more cost) to continue to utilize the PV array?

Please feel free to contact me with any questions, Aspen Solar is NABCEP certified in both PV and THERMAL. Therefore we can provide professional sizing, design, install, maintenance on all systems.

Thank you.

Mike Tierney
President
Aspen Solar Inc.
www.aspensolar.com
NABCEP PV & THERMAL CERTIFIED
Since 1983, "We build the best & service the rest"
From: Gerry [mailto:grterwilliger@gmail.com]
Sent: Wednesday, July 19, 2017 5:14 PM
To: ‘Sarah Gruen’
Cc: mike@aspensolar.com; ‘Susan Philip’
Subject: aspen solar

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Thu, Jul 20, 2017 at 8:28 AM

Gerry <grterwilliger@gmail.com>
To: Mike Tierney <mike@aspensolar.com>, Sarah Gruen <sarah@aspencore.org>
Cc: Susan Philip <susan.philp@basalt.net>, chrisl@sgm-in.com

Thanks Mike. My calculation using a lower PV value had thermal come out ahead by about 15% and your more accurate calculation has PV coming out ahead by about 11%. Because the two systems are comparable in energy production, bottom line is it doesn’t make sense to do away with existing thermal and spend money on PV.

On a second point, we are going to see if the south facing roof of the pool changing room will take the additional weight of PVs (about one ton) and if it will, we’ll want you to give us a bid on doing them.

Gerry
Gerald R. Terwilliger
PO Box 2639
Basalt, CO 81621
(970)927-4629
(970)319-5959

"Reality is for those who can’t make up their own facts" - Darby Conley

From: Mike Tierney [mailto:mike@aspensolar.com]
Sent: Thursday, July 20, 2017 7:46 AM
To: ‘Gerry’ <grterwilliger@gmail.com>, 'Sarah Gruen' <sarah@aspencore.org>
Cc: ‘Susan Philip’ <susan.philp@basalt.net>
Subject: RE: aspen solar

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6 Photos

Kiddie Pool

Boy's Shower

Boy's Locker Room

Pool Mechanical Room
Attachment E
Condition Maps