GRANULAR ACTIVATED CARBON (GA.C) SPECIFICATIONS

The quotation price is to be submitted as a whole unit price (lump sum) for the total replacement of spent GAC in one (1) 82' x 16' x 4' filter (approximately 5,250 cu. Ft.) at the Lowell Regional Water Utility's Treatment Facility including all costs for transportation, necessary equipment, technical expertise, labor, disposal of spent GAC (if virgin material is proposed) without any additional costs to this project.

Proposers are allowed to submit pricing for any 1, 2 or 3 items in the bid form. Materials allowed include virgin GAC (lignite or bituminous) or reactivated GAC. Reactivated GAC must be Lowell's existing material and shall be removed, reactivated and replaced in the filter bed.

General Requirements:

1. Bidder shall supply References and Qualifications for the scope of work to be performed.
2. Each bidder shall visit the site and each bidder shall visit the site and shall inform themselves of all existing conditions. Proof of site visitation is mandatory and must be attached to bid documents. Failure to comply will be considered nonresponsive and bid will be rejected.
3. Bidder is responsible for supplying the necessary equipment and labor for the removal, replacement and disposal of spent GAC (if virgin material is proposed) at no additional cost to the Lowell Regional Water Utility.
4. Bidder is to supply the technical expertise to ensure safe and proper removal and replacement of GAC.
5. The Lowell Regional Water Utility will provide the water flow for the eduction of the spent GAC and replacement of virgin/reactivated GAC.
6. **The start date must be no later than October 1, 2016 and must be completed within (60) sixty days from start date.**
7. The GAC to be supplied shall contain no soluble inorganic substances in quantities capable of producing deleterious or injurious effects upon the health of those consuming the water.
8. A detailed product data sheet on the proposed GAC along with a representative sample (minimum 5 lbs.) shall be supplied along with the Bid if virgin material is proposed.
9. Supplied GAC shall meet the requirements of AWWA standard B604 "Granular Activated Carbon". Reactivation of GAC shall be in accordance with AWWA standard B605. "Reactivation of Granular Activated Carbon".
10. The disposal and tracking of spent GAC shall become the responsibility of the bidder. Neither the City of Lowell nor the Lowell Regional Water Utility is to be held responsible once the spent GAC leaves the property of the Lowell Regional Water Utility.

11. The Lowell Regional Water Utility reserves the right to reject any or all bids in whole or in part, or to accept the bid deemed most advantageous to the City by the Executive Director, Superintendent of Operations and Safety and the Superintendent of Maintenance.
12. Payment will not be received until the new media is installed, backwashed and retested in accordance with these specifications.

TECHNICAL SPECIFICATIONS

VIRGIN GAC and REACTIVATED GAC.

PART 1 - GENERAL

1.1 GRANULAR ACTIVATED CARBON

A. Technical requirements

Approximately 5,250 cubic feet of GAC shall be supplied and installed in the adsorber/filter.

The GAC to be supplied and installed shall be virgin or regenerated granular, and manufactured from lignite, reagglomerated sub-bituminous, or reagglomerated bituminous coal (combined with suitable binders). Peat, wood or coconut based GAC will not be accepted. Regenerated material shall be owners existing GAC combined with sufficient make up Virgin GAC as required to ensure GAC meets the minimum specified parameters.

The GAC shall be suitable for use as filter media in a potable water treatment plant and be effective in the removal of the taste and odor and/or other target compounds as described herein and in the USEPA's Disinfectants and Disinfection Byproducts Rule (DBPR). The GAC shall be visually free of clay, dirt and deleterious material.

Provided GAC is for the treatment of potable water supplies and shall conform to the requirements of the most current edition of AWWA B-604. Reactivation of owners existing GAC shall conform to the requirements of the most current edition of AWWA B605.

The GAC shall meet minimum standards and performance criteria regarding material specifications and physical properties. These performance criteria shall be evaluated based on representative samples of the proposed material that are submitted to the Owner, lab reports, and the Owner's on-site tests of the delivered material. Failure of the samples to meet the performance criteria shall result in the rejection of the GAC and, in the case of job-site samples, in the removal and replacement of any installed materials at no cost to the Owner.

The GAC to be furnished shall meet the following specifications and shall be NSF 61 approved:

Reactivated GAC:

PSD, US Standard Mesh Size 8x30 mesh	15% max over 8 mesh (2.36mm)	5% max under 30 mesh (0.60mm)
Iodine Number, mg, g	850 minimum (for spent GAC>550) 300 minimum (for spent GAC<550) 500 minimum	
Uniformity coefficient	2.1 maximum	
Moisture % as packed	8 maximum *	
Abrasion Number	70 minimum	
Apparent Density (g/cu)	0.2 minimum	

* Moisture content exceeding 8% is permitted in the reference sample collected after shipments are received.

Virgin GAC:

PSD, US Standard Mesh Size 8x30 mesh	15% max over 8 mesh (2.36mm)	4% max under 30 mesh (0.60mm)
Iodine Number, mg, g	850 minimum	
Uniformity coefficient	2.1 maximum	
Moisture % as packed	2 maximum	
Abrasion Number	75 minimum	
Apparent Density (g/cu)	0.2 minimum	
Effective Size, mm	0.8 – 1.0	

B. Safety and Security

All activated carbon shall be produced from coal (lignite, reagglomerated sub-bituminous, or reagglomerated bituminous) mined in North America,

Manufactured into activated carbon in the United States, and sold directly to the customer by the manufacturer.

1. Requirements of the activated carbon supplier:
    a. Each GAC manufacturer or regeneration plant must be a restricted access facility.
    b. The production facilities must be in complete control of manufacturing, milling, loading/packaging, and finished product quality from the time that the raw coal material enters the plant until the finished product is shipped to the customer.
    c. The supplier must be certified to ANS/NSF Standard 61 at the activation plant (not warehouse or re-processing facility). The supplier tendering a bid must be the same company listed by UL or NSF under standard 61, with the plant site identified and the raw material specified. (This will ensure proper and regular auditing of the facility as well as independent sampling and analyses if finished products. The integrity of plant Quality Assurances data and tractability of lot number produced are also verified).
    d. The supplier must manufacture potable grade activated carbon at their own facility, performing all processes normally associated with carbon activation (including but not limited to screening or milling, package and loading etc.) at the same site, under secured and monitored access. No part of the production process shall be subcontracted or in any way performed outside of the control of the manufacturing facility.
    e. The activated products offered must be pre-approved by the Utility and the activated carbon manufacturer must have a minimum of 5+ years of experience servicing the potable water industry.

f. Bulk deliveries will take place in trailers sealed by numbered security seals at every trailer opening, allowing the customer to inspect the seals, verify the correct numbers, and ensure that the shipment was not tampered with during transit. Dedicated bulk carriers shall be used for product deliveries:

   Utilizing trailers designated for the transport of
   Activated carbon intended for use in potable water

   Or

   Trailers that have been used for the transport of
   food-grade materials and have been triple-washed
   prior to the transport of activated carbon.

   GAC delivered in sealed bulk bags may be acceptable. Supplier must ensure that shipment is not tampered with during transit.

g. Each driver shall carry two forms of photographic identification, a commercial driver's license and a company issued ID badge. The bulk trailer shall be loaded with product and sealed within the production plant.
h. Detailed specifications and material quality and testing results Shall be submitted to the Owner for review and approval prior to delivery and installation of the GAC Manufacturer's test Reports shall include the following information:
   i. Manufacturer's name
   ii. Material source and manufacture plant location
   iii. Date of sampling
   iv. Lot or stockpile number identification
   v. Demonstration of compliance with physical properties and specifications

PART 2 - TESTING AND APPROVAL

2.1 MATERIAL TESTING

A. Test Reports

1. The activated carbon supplier shall submit Certificates of Analysis to ensure that the GAC provided meets the required specifications. Test reports on the representative samples of GAC shall contain the following information:

   i. Mesh size Confirmation
   ii. Uniformity Coefficient
   iii. Iodine Number

iv. Moisture as packed (percent)
v. Abrasion Number

B. Material Quality Testing

1. The quality of the GAC shall be determined by testing in accordance with the following standards:

a.	Particle size distribution	AWWA B604
b.	Sieve Analysis	AWWA B604
c.	Uniformity Coefficient	AWWA B604
d.	Moisture	AWWA B604
e.	Iodine Number	ASTM D4607-94
f.	Abrasion Number	ASTM B604
g.	Apparent Density	AWWA B604

C. The Activated Carbon supplier will be required to submit a representative sample of the GAC (if virgin material is proposed) at least two (2) weeks prior to the contracted delivery date along with a written statement certifying that the sample of the GAC material is representative of the GAC media that will be shipped and installed under this contract.

D. The sample(s) must be submitted in clean, vapor-proof containers, plainly marked with the name and address of the manufacturer and identified as to the lot number of the contents. Testing materials shall be in accordance with the testing methods of the AWWA Standard for Granular Activated Carbon (AWWA B604) and appropriate ASTM Standards, NFS 61 approved.

PART 3 - INSTALLATION

3.1 PLACEMENT AND TESTING OF GAC

A. Bulk deliveries will take place in trailers sealed by numbered security seals at every trailer opening, allowing the customer to inspect the seals, verify the correct numbers, and ensure that the shipment was not tampered with during transit. Only dedicated bulk carriers shall be used for product deliveries:

1. Utilizing trailers designated for the transport of activated carbon intended for use in potable water.

2. Trailers that have been used for the transport of food-grade materials and have been triple-washed prior to the transport of activated carbon.

B. Each driver shall carry two forms of photographic identification – a Commercial Drivers License and a Company-issued ID Badge. The bulk trailer shall be loaded with product and sealed within the production plant.

C. Makeup or rinse water needed for the trailer shall be potable water provided by the Owner. The Activated Carbon supplier shall provide any hoses, sight glasses, piping and appurtances for using this water. The Activated Carbon supplier shall provide the compressed air supply required for the transfer of carbon.

D. All water used in the transfer process shall be discharged to the point on site designated by the Owner. No discharges will be permitted without the Owner's permission.

E. The GAC exchange shall be under the direct supervision of the GAC manufacturer's employee, having a minimum of 5 years experience in performing carbon exchanges. Supervision by a third party or agent in not allowed.

F. Bidder shall submit resumes of supervisors capable of performing carbon exchanges, indicating qualifications, years of experience and location.

G. GAC shall be transported, delivered and placed in a careful manner to exclude all dust, dirt or deleterious material and to prevent physical damage to the particles.

H. Bidder shall submit a detailed description for carbon exchange procedures.

I. GAC should be transferred as water slurry whenever possible, using air pressure on the trailer as the motive force. Use of a pump or eductor to transfer the carbon from the trailer into the absorber vessel will also be allowed. Bulk bag unloading of the GAC into an absorber or gravity filter will not be permitted.

J. The Activated Carbon supplier and/or the Contractor will be responsible for the cleanup of all GAC and slurry spills that may occur during the GAC transfer operation.