



North Carolina Department of Health and Human Services
Division of Health Service Regulation
Certificate of Need Section

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<http://www.ncdhhs.gov/dhsr/>

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April 27, 2012

Lisa Griffin
Manager, Certificate of Need
Financial Planning and Analysis
Novant Health, Inc.
2085 Frontis Plaza Boulevard
Winston-Salem, NC 27103


RE: Exempt from Review –Replacement MRI / The Presbyterian Hospital / Acquire a replacement MRI scanner / Mecklenburg County


Dear Ms. Griffin:

In response to your letter of April 13, 2012 the above referenced proposal is exempt from certificate of need review in accordance with N.C.G.S 131E-184(a)(7). Therefore, you may proceed to acquire, without a certificate of need, the GE Optima MR450w 1.5T MRI scanner to replace the existing GE Twinspeed 1.5 MRI scanner, serial number 218465MR3. Presbyterian will not be increasing the number of MRI scanners in the Mecklenburg County MRI inventory nor will Presbyterian be concurrently operating both MRI scanners. This determination is based on your representations that the MRI scanner will be removed from North Carolina as soon as the permanent replacement is up and running and will not be used again in the State without first obtaining a certificate of need. Further please be advised that as soon as the replacement equipment is acquired, you must provide the CON Section and the Medical Facilities Planning Section with the serial number of the new equipment to update the. In addition, you should contact the Construction Section to determine if they have any requirements for development of the proposed project.

It should be noted that this Agency's position is based solely on the facts represented by you and that any change in facts as represented would require further consideration by this Agency and a separate determination. If you have any questions concerning this matter, please feel free to contact this office.

Sincerely,


Fatimah Wilson
Project Analyst


Craig R. Smith, Chief
Certificate of Need Section

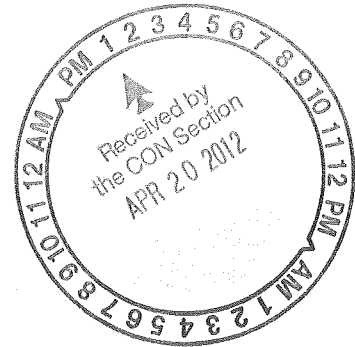
cc: Construction Section, DHSR
Medical Facilities Planning Section, DHSR





Remarkable People. Remarkable Medicine.

Fatimah



April 13, 2012

Fatimah Wilson, Program Analyst
NC Division of Health Service Regulation
Certificate of Need Section
809 Ruggles Drive.
Raleigh, NC 27603

Re: Replacement Equipment Exemption Request - MRI Scanner at Novant Health's Presbyterian Hospital (FID # 943501)/ Mecklenburg County

Dear Ms. Wilson:

This letter outlines Presbyterian Hospital's project to replace an existing 1.5T closed bore magnetic resonance imaging (MRI) scanner with a new 1.5T closed bore MRI scanner located at the hospital. The existing MRI scanner is ten years old and is beyond its useful life in terms of this technology within Presbyterian Hospital. Presbyterian Hospital seeks to replace this outdated MRI scanner with a new MRI scanner from GE Healthcare. See Attachment A for the vendor quote. The estimated total cost to acquire and implement the project is \$1,860,071 of which the equipment cost is \$1,452,201. Please note that the vendor pays the freight cost and this is included as part of the total equipment cost in the quote. This project cost does not include: sales, property or excise taxes as Presbyterian Hospital is a non-profit, tax-exempt organization and is not subject to these taxes. In addition, the expense for on-site training on the new unit for the Presbyterian radiology staff is covered by the vendor quote on Page 24. The existing equipment is to be removed by GE Healthcare at an estimated \$9,870 (see the Page 26 of the equipment quote in Attachment A). Both the existing equipment and the replacement equipment are comparable medical equipment as explained on the following page. This project should be approved by the Agency as exempt pursuant to N.C.G.S. Section 131E-184(a)(7).

This exempt project will replace a functionally similar equipment item and will not increase the inventory of approved MRI scanners in Mecklenburg County. The existing 1.5T MRI scanner is used for imaging at Presbyterian Hospital and the replacement 1.5T MRI scanner will be used for diagnostic MRI studies at Presbyterian Hospital. The proposed new 1.5T scanner is consistent with the replacement equipment definition at 10 NCAC 03R.0214 (d) which states that the replacement equipment is comparable to the equipment being replaced if it has the same technology as the equipment currently in use, although it may possess expanded capabilities due to technological improvements.

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Replacement Equipment Request – Presbyterian Hospital MRI Scanner

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Pursuant to 10A NCAC 14C.0303 the proposed MRI scanner constitutes replacement equipment because:

1. It is comparable to the equipment currently in use. It has the same technology as the equipment currently in use, although it does possess expanded capabilities due to the technological improvements. Both the 1.5T MRI scanner and the proposed 1.5T MRI scanner have been and will be used to produce a wide variety of diagnostic MRI studies.
2. It is functionally similar and is used for the same diagnostic or treatment purposes as the equipment currently in use and is not used to provide a new health service.
3. The acquisition of the new equipment will not result in more than a 10% increase in patient charges or per procedure operating expenses within the first twelve months after the replacement equipment is acquired.
4. The existing equipment was not purchased second-hand nor was the existing equipment leased.
5. The replacement equipment is not capable of performing procedures that will result in the provision of a new health service or type of procedure that has not been provided with the existing equipment.

Attached for your convenience please find:

- 1) a vendor equipment price quote (Attachment A);
- 2) project/capital cost schedule which identifies the components of the project costs (Attachment B);
- 3) a certified estimate of related construction costs from an independent licensed North Carolina architect (Attachment C); and
- 4) the NC CON equipment comparison form summarizing essential information about the proposed equipment purchase (Attachment D);

Presbyterian Hospital's acquisition of the replacement MRI scanner does not require a certificate of need because none of the definitions of "new institutional health service" set forth in N.C.GS Section 131E-176(16) is implicated. As discussed above, the total cost for the project is \$1,860,071. This is below the \$2 million dollar statutory exemption threshold for replacement equipment. This includes the cost of the equipment, as well as studies, surveys, designs, plans, working drawings, specifications, construction installation and other activities essential to making the equipment operational (such as staff training).

The Democratic National Convention (DNC) will be held in Charlotte in September 2012. The convention will be held primarily at Time Warner Cable Arena, with

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Replacement Equipment Request – Presbyterian Hospital MRI Scanner

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additional locations to include Bank of America Stadium and the Charlotte Motor Speedway. Presbyterian Healthcare is the official healthcare provider at the arena and a healthcare provider chosen by the DNC. Therefore, Presbyterian Healthcare will have a major presence at the convention. Presbyterian Healthcare will provide on-site healthcare services at the arena, in addition will be prepared to provide care and services at its Presbyterian facilities, including Presbyterian Hospital which is the closest Presbyterian tertiary hospital to the arena.

As such, Presbyterian Hospital would like to have the new MRI scanner installed and operational by the start of the convention to ensure that there is no decrease in MRI coverage for DNC and all surrounding events. In order to meet this timeframe, Presbyterian Hospital intends to contract for temporary mobile MRI services with MedQuest. A Notice of Replacement Equipment related to the use of this temporary mobile MRI scanner was submitted by MedQuest and has been approved by the Agency as of April 11, 2012.

In conclusion, based on the information described above, please confirm that Presbyterian Hospital's replacement equipment request does not constitute a "new institutional health service" and does fit within the replacement equipment exemption definition such that it is not subject to certificate of need review.

Please let us know as soon as possible if you need additional information to assist in your consideration of this request. Thank you for your prompt consideration of this request.

Sincerely,



Lisa Griffin
Manager, Certificate of Need
Financial Planning and Analysis
Novant Health, Inc.

Enclosures

cc: Laura MacFadden, Novant Health
Per Normark, MedQuest

File: PH MRI REER Cover Letter 04 13 12.doc

Attachment A

Quotation Number: P3-C141063 V 20

Presbyterian Hospital
200 Hawthorne Ln
Charlotte NC 28204-2515

Attn: Shelly Hall
200 Hawthorne Ln
Charlotte NC 28204

Date: 04-12-2012

This Agreement (as defined below) is by and between the Customer and the GE Healthcare business ("GE Healthcare"), each as identified herein. GE Healthcare agrees to provide and Customer agrees to pay for the Products listed in this GE Healthcare Quotation ("Quotation"). "Agreement" is defined as this Quotation and the terms and conditions set forth in either (i) the Governing Agreement identified below or (ii) if no Governing Agreement is identified, the following documents:

- 1) This Quotation that identifies the Product offerings purchased or licensed by Customer;
- 2) The following documents, as applicable, if attached to this Quotation: (i) GE Healthcare Warranty/ies; (ii) GE Healthcare Additional Terms and Conditions; (iii) GE Healthcare Product Terms and Conditions; and (iv) GE Healthcare General Terms and Conditions.

In the event of conflict among the foregoing items, the order of precedence is as listed above.

This Quotation is subject to withdrawal by GE Healthcare at any time before acceptance. Customer accepts by signing and returning this Quotation or by otherwise providing evidence of acceptance satisfactory to GE Healthcare. Upon acceptance, this Quotation and the related terms and conditions listed above for the Governing Agreement, if any, shall constitute the complete and final agreement of the parties relating to the Products identified in this Quotation. The parties agree that they have not relied on any oral or written terms, conditions, representations or warranties outside those expressly stated or incorporated by reference in this Agreement in making their decisions to enter into this Agreement. No agreement or understanding, oral or written, in any way purporting to modify this Agreement, whether contained in Customer's purchase order or shipping release forms, or elsewhere, shall be binding unless hereafter agreed to in writing by authorized representatives of both parties. Each party objects to any terms inconsistent with this Agreement proposed by either party unless agreed to in writing and signed by authorized representatives of both parties, and neither the subsequent lack of objection to any such terms, nor the delivery of the Products, shall constitute an agreement by either party to any such terms.

By signing below, each party certifies that it has not made any handwritten modifications. Manual changes or mark-ups on this Agreement (except signatures in the signature blocks and an indication in the form of payment section below) will be void.

- Terms of Delivery: FOB Destination
- Quotation Expiration Date: 06-29-2012
- Billing Terms: 80% delivery / 20% Installation
- Payment Terms: UPON RECEIPT
- Governing Agreement: None

Each party has caused this agreement to be signed by an authorized representative on the date set forth below. Please submit purchase orders to GE Healthcare
3200 N. Grandview Blvd., Mail Code WT-897, Waukesha, WI 53188

GE HEALTHCARE

 Scott Ramsey Date
 Product Sales Specialist
 , NC
 US
 Phone: 919-556-2376
 Fax: 919-869-1618
 Floyd.Ramsey@med.ge.com

INDICATE FORM OF PAYMENT:

(If there is potential to finance with a lease transaction, GE HFS or otherwise, select lease.)

___ Cash * ___ Lease ___ HFS Loan

If financing please provide name of finance company below*:

CUSTOMER

Authorized Customer Date

Print Name and Title

PO #

Desired Equipment First Use Date

GE Healthcare will use reasonable efforts to meet Customer's desired equipment first use date. The actual delivery date will be mutually agreed upon by the parties.

*Selecting Cash or not identifying GE HFS as the finance company declines option for GE HFS financing.



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Qty	Catalog No.	Description
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1		Optima MR450w 1.5T GEM 32ch MR System Loyalty - Optima MR450w 1.5T with GEM
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1	S4500WN	Optima MR450w 1.5T with GEM MR System
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Patient expectations of MR have shifted in recent years, as patients have begun to demand a better, more comfortable scanning experience. Increasing the size of the bore is a good first step, but it's only the beginning. The right system should overcome traditional limitations of wide-bore MR, offering both excellent images and a user-friendly experience. Patients should be more comfortable during their scan, and clinicians more comfortable in making a diagnosis. All the while, organizations should expect their MR system to help them deliver solid financial returns, maintain a high standard of patient safety, and increase the quality of their care.

The Optima MR450w with GEM 1.5T MRI scanner from GE Healthcare offers a range of new functionality, provides a more patient-friendly environment and is a clinical workhorse system for practices of all sizes and specialties.

Optix RF Receive Chain: GE's innovative Optical RF receive technology improves signal detection while simultaneously reducing electrical noise. By locating the receiver electronics on the side of the magnet and close to the origin of the MR signal, interference from external noise sources is reduced thus improving image quality and SNR. The result is a 27% SNR improvement over previous generation, non-optical systems for volumetric scanning.

The use of optical transmission reduces the cabling footprint over conventional copper cable designs and enables high channel count configurations without requiring additional space. The Optix technology can seamlessly route signals from any coil port to the receiver using a dynamic switching RF hub. To enable the simultaneous use of multiple coils, there are multiple high-density coil connections ports conveniently located where the detachable table docks to the scanner.

- Sampling Bandwidth 80MHz.
- Surface coil Receive ports 136.

Volume Reconstruction Engine 2.0 (VRE): The backbone of any high-channel count receiver system is the reconstruction architecture. The Optima MR450w utilizes the latest dual-core 2.6 GHz processing technology with the VRE 2.0 recon architecture. With its 36 GB of memory, acquisition-to-disk technology, and 13000 2D FFT/s frame rate, the VRE delivers the processing power to quickly reconstruct high-resolution 3D volumetric data.

eXtreme Gradient Platform: The powerful gradient performance of the Optima MR450w system enables high resolution and fast acquisitions. The gradient platform includes the eXtreme Gradient Driver (XGD) and the optimized large field of view gradient coil. The eXtreme Gradient Driver (XGD) is housed within a single cabinet to simplify installation. Each axis is driven by a dedicated power supply and amplifier to ensure consistent performance for all image



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Qty	Catalog No.	Description
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orientations. By incorporating a water-cooled architecture, this system supports continuous peak operation with a 100% duty cycle and excellent stability for both long-term serial studies and advanced applications.

- Peak Gradient Amplitude of 34 mT/m
- Peak Gradient Slew Rate of 150 T/m/s
- Peak XGD Current 660 Amps.
- Peak XGD Voltage 1650 Volts.

Gradient systems have historically been defined in terms of peak amplitude (mT/m) and slew rate of the generated field (T/m/s). While these parameters are important in achieving high temporal resolution parameters such as TR's and TE's, applications such as fMRI, PROPELLER, TRICKS, and spectroscopy rely more heavily on gradient fidelity, accuracy, and reproducibility. Fidelity is defined as the degree to which an electronics system accurately and reproducibly amplifies an input signal. Applied to MR gradient systems, gradient fidelity refers to the system's ability to generate requested waveforms. The high fidelity of the Optima MR450w gradients is achieved through the use of an innovative design of the digital control architecture within the gradient amplifier. This architecture has two digital control paths.

- Dedicated active feedback loop to regulate current errors.
- Innovative feed-forward model to match amplifier output to gradient coil.

Gradient subsystem gradient fidelity, accuracy, reproducibility parameters:

- Maximum integrated error: 0.48 ppmFS-s.
- Shot-to-shot: 0.16 ppmFS-s.
- Symmetry error: 0.32 ppmFS-s.

MR450w GEM Express Patient Table with IntelliTouch Technology: The fully detachable GE Express Patient Table incorporates the Liberty Docking System to improve safety, exam efficiency, and patient comfort over fixed-table solutions.

Easily docked and undocked by a single operator, the patient table is simple to move in and out of the exam room for patient transport and preparation. These become vital features in those instances where multiple patient transfers can negatively impact patient care or when emergency evacuation is required; the table can be undocked and removed from the scan room in under 30 seconds with just one technologist. In time-sensitive situations there is no need to remove or disconnect surface coils as the system can automatically disconnect the coils for you.

Express Patient Table Comfort: The fully detachable table may help reduce patient anxiety and provide personal discretion by enabling patients to prepare for the exam in a private space. This is particularly important for patients undergoing a breast evaluation.

To improve patient comfort and safety, the GEM Suite includes a unique set of Patient Comfort



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		<p>pads. The pads are designed with variable density foam that uniquely compresses based on patient geometry and weight. Certain sections of the GEM Suite pads are designed to compress more easily than others and this optimal design may minimize pressure points and improve patient comfort.</p> <p>In addition, the pads are made with UltraFresh protective coating, are strong, fluid-proof, air tight, and easily cleanable. An anti-skid undersurface reduces pad movement on the table and thus may simplify patient setup and egress.</p> <p>Symmetric Scan: To help reduce patient anxiety, the GEM Express Patient Table is designed to accommodate head first or feet-first imaging for all neurologic, cardiac, abdominal, spinal, and peripheral vascular exams, as well as the majority of musculoskeletal imaging. Whole body imaging may also be completed in either patient orientation. All breast imaging is completed feet first.</p> <p>Symmetrically positioned within the patient supporting cradle are three high-density coil connection ports. One at each end of the patient cradle, and another one embedded under the covers to connect the GEM Posterior Array. This design enables all components of the GEM Suite to support either patient orientation and helps ensure the most comfortable patient position. Two additional coil connection ports are included on the scanner docking mechanism.</p> <p>Ergonomics: With one hand and with one simple motion, the integrated arm boards and IV pole can be optimally positioned to support the patient for injections or transportation. This unique capability of the Optima Express Table</p> <p>also makes it ideally suited for multi-station exams with no scan room intervention, such as peripheral vascular (run-off) imaging.</p> <ul style="list-style-type: none"> • Patient table drive: Automated, power driven vertical and longitudinal. • Longitudinal speed: 30 cm/sec (fast) and 0.5 cm/sec (slow). • Total cradle length: 211 cm. • Positioning accuracy: +/- 0.5 cm. • Maximum patient weight for lift, scanning, and when mobile: 227 kg (500 lbs). <p>IntelliTouch patient positioning: The Optima MR450w has automated many routine tasks to both simplify patient preparation, and gain productivity. With IntelliTouch Technology, the technologist simply touches the side of the patient table and then a highlighted button to efficiently complete the following:</p> <ul style="list-style-type: none"> • Landmark the patient. • Activate the surface coil. • Center the patient in the bore. • Start scanning. • Acquire, process and network images.



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		<p>For those patients where pinpoint alignment is desired, laser alignment lights may be used for either the selection or confirmation of landmark position.</p> <p>Additional tables may be purchased for use with the scanner. With a second table, the next patient can be fully prepared for the exam outside the magnet room while the current patient is being scanned, thus maximizing system utilization and productivity.</p> <p>This GEM Express Patient Table is only compatible with the Optima MR450w with GEM system and cannot be docked to any other type of GE scanner. Multiple GEM Express Patient Tables may be used with a single system to enhance scanner productivity and workflow. All GEM Suite surface coil components (GEM Posterior Array, GEM Head/Neck Unit, GEM Anterior Array, GEM Peripheral Vascular Arrays) and other optional surface coils are sold as separate items with separate catalog numbers.</p> <p>Optimally designed for patient safety, patient comfort, and efficient workflow, the external features of the Optima MR450w also provide an aesthetically pleasing look and feel that can reduce patient anxiety. The wide open flare of the covers increase the effective bore size and may reduce patient anxiety when entering the scan room or magnet bore. With patient-optimized lighting and air conditioning, the system can be ideally set for each individual, increasing their control of the environment.</p> <p>Express Exam and ScanTools: The Express Exam and ScanTools includes a comprehensive suite of workflow features, advanced applications, and parallel imaging capabilities to enable the user to harness the Simply Powerful capabilities of the scanner efficiently and effectively.</p> <p>The automated workflow features of the Express Exam interface includes the Modality Worklist, Protocol Library, AutoStart, AutoScan, AutoVoice, Linking, and Inline Processing that complete much of the work for the user.</p> <p>Modality worklist: The modality worklist (MWL) provides an automated method of obtaining exam and protocol information for a patient directly from a DICOM Worklist server. For sites with full DICOM connectivity, once a patient has been selected from the MWL, a new session is opened on the host interface and the relevant exam details are highlighted for the user. The protocol may be selected well in advance of the patient's arrival at the MR suite thereby simplifying exam preparation and reducing necessary work by the technologist during the time-critical procedure.</p> <p>Protocol libraries and properties: The MR system provides the user with complete control of protocols for simple prescription, archiving, searching, and sharing. The protocols are organized into two main libraries, a GE optimized set that are included with the system, and Site Authored.</p> <p>ProtoCopy: Standard is the ProtoCopy feature which enables a complete exam protocol to be shared with the click of a mouse. The exam protocol can originate from either a library or</p>



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		<p>previously acquired exam. This enables routine archive of protocols for emergency backup and simple management of libraries across multiple systems.</p> <p>Workflow Manager: Once a protocol has been selected for an exam, it is automatically loaded into the Workflow Manager. The Workflow Manager controls image prescription, acquisition, processing, visualization and networking and may fully automate these steps, if requested.</p> <p>AutoStart: With AutoStart, once the landmark position has been set and the technologist leaves the room the Workflow Manager will automatically start the first acquisition in the exam.</p> <p>Linking: Linking automates the prescription of images for each series in an exam. Once the targeted anatomical region has been located the Linking feature combines information from a prescribed imaging series to all subsequent series in the Workflow Manager.</p> <p>AutoScan: With AutoScan enabled, the Workflow Manager will sequentially go through the list of prescribed series without any user interaction.</p> <p>AutoVoice: The AutoVoice feature ensures that consistent and repeatable instructions are presented to the patient for each and every exam. User selectable, pre-recorded instructions are presented at defined points in the acquisition. The AutoVoice feature includes instructions in over 14 languages and the user can create and include their own unique voice instructions for local needs.</p> <p>Inline processing: For certain tasks, the user must accept the results, or complete additional steps prior to saving the images to the database. In these cases the data is automatically loaded into the appropriate tool, then the system will await further instruction by the user.</p> <p>Inline viewing: Inline viewing allows the user to conveniently view, compare, and analyze images without having to switch to the Browser. Simply select the series to view from the Workflow Manager and the images are displayed along with standard image display tools.</p> <p>Image fusion: To better visualize tissue and contrast, multiple images from separate acquisitions can be overlaid on one another. High-resolution anatomical images can be automatically fused with functional data or parametric maps for improved visualization by the user. The data is registered using translation and rotation and distortion correction to ensure accurate fusion.</p> <p>Spin Echo: The single echo gold standard for generating T1, proton density and T2 images.</p> <p>Fast Spin Echo (FSE), Fast Spin Echo-XL (FSE-XL): Uses a train of spin echoes to reduce total acquisition times and provide high resolution datasets. The XRB gradient performance allows for very short echo spacing, thus maintaining image resolution and SNR even in long echo train acquisitions.</p> <p>Fast Recovery Fast Spin Echo (FRFSE): Is an extension of the Fast spin Echo sequence and incorporates an additional refocusing pulse and 90 degree excitation at the end of the echo train. This additional forced recovery of the long T1 and T2 spins increases T2 contrast with shorter acquisitions times.</p>

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		<p>FLAIR: T1 and T2 Fluid Attenuated Inversion Recovery (FLAIR) pulse sequences have been designed expressly for neuro applications. FLAIR allows suppression of signal from cerebrospinal fluid (CSF).</p> <p>Double/Triple IR: These pulse sequences are included to allow black-blood imaging for studies of cardiac morphology. Triple IR adds fat suppression to black-blood imaging.</p> <p>3DFRFSE: A sequence for creating high resolution, three-dimensional T2-weighted images of all anatomies and is especially useful for MR cholangiopancreatography (MRCP) studies.</p> <p>Single-Shot Fast-Spin Echo (SSFSE): An ultra fast technique that permits complete image acquisition following a single RF excitation. It can acquire slices in less than one second, making it an excellent complement to T2-weighted brain and abdominal imaging and MRCP studies.</p> <p>GRE, FGRE, SPGR, FSPGR: This suite of gradient echo techniques uses short TR and TE times to generate Proton Density, T1, T2, T2* tissue contrast, or a combination thereof, in far less time than conventional spin echo acquisitions. The ultra-short TR and TE times possible with these sequences also ensure the performance needed for state-of-the-art vascular and contrast-enhanced MRA studies.</p> <p>2D and 3D Dual Echo Gradient Echo: A vital tool for abdominal imaging. This variation on conventional gradient echo provides a pair of images for which the signals from water and fat either are in-phase or out-of-phase. By design, all of the images acquired within a single breath-hold are in perfect registration.</p> <p>2D and 3D Time of Flight (TOF), 2D-Gated TOF: TOF Imaging and Enhanced 3DTOF Imaging are all ideal for MR angiography. Based on conventional gradient echo scanning, time of flight imaging techniques rely primarily on flow-related enhancements to distinguish moving from stationary spins.</p> <p>2D Phase Contrast (2DPC), 3D Phase Contrast (3DPC): These techniques demonstrate flow velocities and directional properties in vessels and other moving fluids such as cerebral spinal fluid and aortic flow. These acquisitions provide the data for quantitative flow analysis.</p> <p>2D MERGE: Multiple Echo Recombined Gradient Echo (MERGE) uses multiple echoes to generate high-resolution images of the C-spine with excellent gray-white matter differentiation. By combining early echoes with high SNR and late echoes with improved contrast, the result is improved cord contrast within the spinal column.</p> <p>3D MERGE: The 3D MERGE sequence has been optimized to generate clear tissue contrast in the cervical spine. The high in-plane resolution and thin slices enable excellent image reformats for better tissue visualization for all angles.</p> <p>COSMIC (Coherent Oscillatory State acquisition for Manipulation of Image Contrast): COSMIC is a 3D imaging technique specifically tailored for cervical spine evaluation. The unique fluid-weighted contrast yields improved visualization of the cervical nerve roots and</p>

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		<p>intervertebral disks. The high resolution Images are easily reformatted for better tissue visualization from any orientation.</p> <p>2D FIESTA: FIESTA (Fast Imaging Employing STeady-state Acquisition) is designed to produce high SNR Images extremely rapidly. The technique features an extremely short TR and fully balanced gradients to rephase the transverse magnetization at the end of each TR interval. For very short TR sequences, the signal intensity depends strongly on the ratio T2/T1 and is largely independent of TR. As result, this pulse sequence accentuates the contrast of spins with a high T2/T1 ratio, such as CSF, water and fat while suppressing the signal from tissues with low T2/T1 ratio, such as muscle.</p> <p>2D FatSat FIESTA: With the added capability to suppress the signal from fat, this sequence generates excellent contrast between the vasculature and surrounding tissues.</p> <p>3D FIESTA: The 3D FIESTA technique is especially useful for the rapid acquisition of high spatial-resolution images of static structures such as cochlea, internal auditory canal, or joints.</p> <p>3D FatSat FIESTA: 3D FatSat FIESTA is advanced software designed for imaging of the coronary arteries. The use of VAST (Variable Sampling in Time) technology greatly shortens breath-holding requirements or allows for higher spatial resolution.</p> <p>BRAVO (BRAIn VOLUME Imaging): This IR-prepared T1-weighted 3D Gradient Echo imaging technique affords isotropic, whole-brain coverage with 1x1x1 mm resolution. Coupled with parallel imaging, this sequence produces superior gray white matter contrast in just 2 to 3 minutes.</p> <p>SPECIAL: Spectral Inversion at Lipids is a spectral spatial inversion technique for fat saturation in 3D FGRE pulse sequences.</p> <p>LAVA: LAVA is a three-dimensional (3D) spoiled gradient echo technique designed specifically to image the liver with unprecedented definition, coverage, and speed in a single breath hold. Excellent fat suppression, through a version of the SPECIAL technique customized for the liver, is one of the reasons for the high definition of anatomical structures. The coverage and speed of LAVA are the result of short TR, Innovative use of partial k-space acquisition, and advanced parallel imaging.</p> <p>For improved tissue contrast, LAVA is compatible with Flex imaging. The LAVA Flex acquisition will provide a water-only, fat-only, in-phase and out of phase data sets in a single acquisition and produce images with significantly reduced chemical shift and susceptibility artifacts.</p> <p>FastCINE: This pulse sequence is included specifically for studies of cardiac function. Through the use of retrospective gating, it allows full R-R coverage with high multi-phase temporal resolution for excellent visualization of myocardial wall motion.</p> <p>iDrive Pro: iDrive Pro brings real-time interactive imaging to the MR system, making it easier to generate detailed diagnostic information on just about any anatomy, including organs that are</p>



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		<p>subject to motion artifacts, such as spine, heart, diaphragm and GI tract. The iDrive Pro technique allows the user to change scan parameters on the fly, during scanning, to evaluate the results immediately.</p> <p>SmartPrep: SmartPrep uses a special tracking pulse sequence to monitor the MR signal through a user-prescribed volume to detect the arrival of an injected contrast bolus and to trigger the acquisition when the contrast agent has arrived in the target tissue. Use of SmartPrep provides optimum timing of contrast enhancement.</p> <p>EchoPlanar: EchoPlanar imaging enables rapid imaging required for such studies as functional brain mapping. Both EchoPlanar and FLAIR EchoPlanar techniques make it easier to generate neuro studies from patients who cannot or will not stay still long enough for conventional techniques.</p> <p>Diffusion EchoPlanar Imaging: This Diffusion Weighted Single Shot Echo-Planar Imaging (EPI) technique is especially useful for detecting acute and hyper-acute stroke. Its functionality includes Single Shot EPI and FLAIR EPI, Multi-NEX capability, Isotropic Diffusion-Weighting Imaging and on-line image processing. To enhance body diffusion, Adiabatic SPectral Inversion Recovery (ASPIR) and STIR saturation techniques are supported.</p> <p>Array Spatial Sensitivity Encoding Technique: ASSET imaging option is an image-based parallel imaging technique used to speed data acquisition. For temporally sensitive acquisitions, ASSET reduces image blurring and motion, enables greater anatomical coverage, and reduces SAR. Parallel imaging acceleration factors up to 3.0 are supported in one dimension depending on the coil selected.</p> <p>Auto-Calibrating Reconstruction (ARC): Is a GE exclusive self-calibrated parallel imaging technique that eliminates breath-hold mismatch errors by imbedding the calibration data within the scan data. In addition, this unique reconstruction permits small FOV imaging by minimizing focal parallel imaging artifacts from the exam. Supporting both 1D and 2D acceleration, ARC supports high acceleration factors for reduced scan time.</p> <p>Parallel imaging is supported across all anatomies with acceleration factors that are dependent on the phased-array coils utilized.</p> <p>Automated 3D Distortion Correction: Included is automated 3D distortion correction software that corrects for spatial distortions induced by non-linearities in the gradient field. The process is completely automated and is imbedded with the MR data reconstruction process. It is compatible with 2D and 3D imaging acquisitions.</p> <p>IVI: The Interactive Vascular Imaging (IVI) user interface allows operators to quickly remove background from MRA images in order to generate angiographic and maximum intensity projections (MIP) in multiple scan planes.</p> <p>Multi-Projection Volume Reconstruction (MPVR): MPVR provides quick and easy generation of</p>



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		<p>reformations through any 3D MR data sets.</p> <p>FuncTool Performance: This package enables advanced MR-image post-processing using a wide range of sophisticated algorithms, including eADC maps, correlation coefficients for mapping of motor strip and visual/auditory stimuli, NEI (Negative Enhancement Integral), MTE (mean time to enhance), Positive Enhancement Integral, Signal Enhancement Ratio, Maximum Slope Increase, Maximum Difference Function, Diffusion Tensor Post-Processing, (requires DTI option), 3D CSI Post Processing.</p> <p>MR Pasting: Combine images from separate acquisitions into a single series with MR Pasting. MR Pasting is an image analysis software package that facilitates the display and filming of multiple station MR data sets in body applications (total spine, total body), as well as peripheral MR angiography data. MR Pasting will automatically register and combine multiple acquisition stations into a single image of covered anatomy.</p> <p>BrainSTAT software for time course analysis: The BrainSTAT post-processing application automatically generates parametric maps for neuro Blood Flow, Blood Volume, Mean Transit Time, and Time to Peak signal intensity. A Gamma Variant fitting algorithm is used to automatically estimate the arterial input function, then calculate the quantitative values for the four parametric maps.</p> <p>R2* Tool: Generate quantitative relaxation maps with the R2 Star (R2*) analysis tools in Functool. With the Express Exam workflow, this feature can automatically generate R2* maps (in units of Hz) and T2* maps (in units of milliseconds) after the multi-echo data has been acquired.</p> <p>Included is the host computer, keyboard, mouse, monitor, and a quadrature transmit/receive RF head coil.</p>
1	M7000ZR	<p>Optima MR450w with GEM Magnet Design</p> <p>To improve the patient experience and provide high image quality, no other component of an MRI system has greater impact than the magnet. The Optima MR450w system features a short, wide bore magnet that delivers a large field of view. The magnet geometry has been optimized to reduce patient anxiety by providing more space in the bore and more exams with the patient's head outside of the magnet. The 50cm field of view provides uniform image quality and can reduce exam times since fewer acquisitions may be necessary to cover large areas of anatomy. Complemented by GE's active shielding technology, the Optima MR450w has very flexible installation specifications to provide easy siting. And with zero-boil-off magnet technology, helium refills are effectively eliminated, thus reducing operating costs and maximizing uptime.</p> <p>Magnet:</p> <ul style="list-style-type: none"> • Manufactured by GE Healthcare. • Operating field strength 1.5T (63.86 MHz).



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- Active magnet shielding.
- Zero boil-off Cryogenics.
- Magnet length 145cm.
- Patient Aperture 76 cm.
- Patient Bore Diameter 70cm.
- Patient Bore Length 105cm.
- Maximum Field of View 50 cm x 50 cm x 50 cm.

Magnet Homogeneity: Typical ppm and Guaranteed ppm shown.

- 10cm DSV 0.007 and 0.02.
- 20cm DSV 0.035 and 0.06.
- 30cm DSV 0.11 and 0.18.
- 40cm DSV 0.5 and 0.7.
- 45cm DSV 1.2 and 1.6.
- 50x50x45cm 2.3 and 3.6.
- 50cm DSV 3.3.

DSV = Diameter Spherical Volume. Homogeneity for an elliptical volume of 50cm (x,y) by 45cm (z) dimension volume is shown for reference. Fringe field (axial x radial):

- 5 Gauss = 4.0 m x 2.5 m.
- 1 Gauss = 6.2 m x 3.7 m.

Quiet Technology: GE has implemented Quiet Technology on critical components of the Optima MR system to reduce acoustic noise and improve the patient environment. This technology enables full use of the eXtreme Gradient Platform for excellent image quality, while maintaining a safe environment for the patient. The technology encompasses the gradient coil, RF body coil, and magnet mounting.

1 S4500WL

Optima MR450w Preinstallation Collector

The Preinstallation Collector delivers to the site in advance of the magnet and main electronic components. This facilitates the later delivery and installation of supporting electronics. The following are the main components in the Preinstallation collector:

- Heat exchange cabinet for distribution of chilled water.
- Primary Penetration wall panel for support of the penetration cabinet.
- Secondary Penetration wall panel for support of gradient filters, helium cables, and chilled air and water.
- Helium cryocooler hose kit.
- Cabinet Dollies are provided to install the System Cabinets. Dollies remain the property of GE to be returned after cabinets are in place at customer site.



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Qty	Catalog No.	Description
1	M7000ZP	<p>MR450w Dock and 32-Channel Switch Collector</p> <p>The MR450w Dock and 32-Channel Switch collector provides the interface between the magnet and GEM Express Patient Table with IntelliTouch. Also included is the RF signal switching hardware that routes the input signals to the respective OpTix receivers.</p>
1	S4500WH	<p>Optima MR450w Cable Configuration - A</p> <p>To accommodate various electronic and scan room configurations and sizes, the MR450w has preset lengths of cables and connector kits to speed system installation. This cable collection is compatible with fixed and relocatable building configurations.</p>
1	M1060MA	<p>Vibroacoustic Damping Kit</p> <p>Material in the Vibroacoustic Damping Kit can significantly attenuate the transmission of gradient-generated acoustic noise through the building structure to nearby areas, including adjacent rooms and floors above or below the MR suite. If this kit is applied during the installation of a new magnet, no additional service charges are necessary. However, installation of the Vibroacoustic Damping kit under an existing magnet requires special steps. The steps to prepare the site and steps to install, such as modifications to the RF screen room, and other magnet rigging, modifications to the RF screen room, and other finishing work, are not covered in the pricing.</p>
1	M7000WL	<p>MR450/MR750 Main Disconnect Panel</p> <p>The Main Disconnect Panel safeguards the MR system's critical electrical components, by providing complete power distribution and emergency-off control.</p>
1	M1000LH	<p>MR Safety Warning Kit - English</p> <p>Maintaining awareness around both patient and personnel safety is of paramount concern. This versatile kit contains signage in the English language that can be posted around the MR suite to heighten awareness of a high field MR system and the special precautions that ensure the safety of patients, technologists, and other people who come into close proximity with the MR system.</p>
1	M3335JZ	<p>English Keyboard</p> <p>Required for our operator console. This keyboard is ergonomically designed to keep your staff comfortable even through the longest shifts. The scan control keyboard assembly has an intercom speaker, microphone, volume controls and emergency stop switch.</p>
1	M7000LT	DV Paper Operator Manual - English
1	M7000ZT	Cable Concealment Kit - MR450w GEM, MR750w, MR750w GEM



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		The Cable Concealment Kit option accommodates a wide-range of scan room ceiling heights and is designed to provide a clean-look installation by concealing the overhead cabling from view.
1	M1000MW	Operator's Console Table Wide table designed specifically for the color LCD monitor and keyboard.
1	M3335CB	1.5T Calibration Phantom Kit This 1.5T calibration kit contains a large volume shim phantom, a daily quality assurance phantom, an echo-planar calibration phantom, and the associated loader shells.
1	M3335CA	Calibration Kit Phantom Holder Cart
1	S7505ZB	Discovery/Optima Cardiac Pak The Cardiac Pak includes the following: <ul style="list-style-type: none"> • MR Echo • Tagging • 3D Heart with Cini IR, 3D MDE and Navigator <p>MR Echo</p> <p>MR Echo is a dedicated Cardiac MR interface that eases cardiac workflow and combines leading edge pulse sequences used specifically in cardiac imaging. It includes:</p> <p>2D FIESTA imaging for cardiac wall motion visualization both in classic gated mode and with a real-time ability that needs no gating nor patient breath-holding. The real time imaging combines the resolution of MRI with the ease of use of Echocardiography and hence the product name MR Echo. The real time and gated versions of the wall motion pulse sequence use a FIESTA sequence for superb bright blood pool images which contrast against a dark myocardium for maximum contrast to noise ratio. FIESTA combined with parallel imaging permits acquisition times of approximately 50ms, which results in 20 frames/second in the real time mode.</p> <p>Time Course imaging is performed with MR Echo and includes two new pulse sequences to visualize the myocardial tissue at a single phase over a period of time. The first of these is an FGRE pulse sequence which uses the GE exclusive notched saturation pulse to maximize contrast to noise ratio. The second is a FIESTA base time course technique, which permits time course imaging in multiple planes simultaneously Both techniques use ASSET parallel imaging speed up techniques. 'Lock coverage' is a feature within MR Echo that automatically adjusts the slice gap and R-R intervals to match the desired acquisition rate. This is particularly useful in stress imaging where there is a change in heart rate and a desire to maintain (or lock) the coverage of the time course dataset.</p>



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		<p>Myocardial Evaluation is also within the MR Echo interface to allow scar tissue assessment of the heart.</p> <p>Autovoice can be combined with all pulse sequences within MR Echo allowing automated voice commands in over seven differing languages.</p> <p>Cardiac Tagging</p> <p>With Cardiac Tagging, an even distribution of spatial saturation lines are applied across the myocardium in the FastCINE Gradient Echo pulse sequence to enable cardiac wall motion assessment. Cardiac Tagging allows the application of 1D diagonal stripes or 2D grid saturation pulses once per R-R interval immediately following the R-wave trigger. Resulting images demonstrate motion (or lack of motion) effects.</p> <p>3D Heart</p> <p>3D Heart is a 3D Fat Sat FIESTA sequence (Optimized for 1.5T) or 3D IRPrep FGRE sequence (Optimized for 3T) that provides whole-heart coverage for coronary artery imaging or cardiac chamber imaging. It employs a T2 preparation pulse at 1.5T to provide myocardial suppression for better coronary visualization. A multi-slab localizer allows easy whole-heart prescription, and increase inflow effect for high vessel conspicuity. A navigator echo pulse that detects motion of the diaphragm is utilized to enable free breathing acquisition. The navigator has been optimized to improve robustness, and employs prospective real-time motion correction to improve motion suppression and increase scan efficiency. The multi-slab acquisition minimizes the effect of respiratory drift and heart rate variability on image quality. An optimized phase ordering and steady state preparation has also been used to improve CNR and SNR.</p> <p>As this sequence supports 3D IRPrep FGRE acquisition mode on both 1.5T & 3T, it can also be used for 3D MDE acquisition. With the purchase of 3D Heart, 3 additional options (3D MDE, Cine IR and Cardiac Navigator) would be included.</p> <p>Cine IR is a conventional ECG-gated, gradient recalled echo FASTCARD or FASTCINE acquisition sequence with an inversion recovery (IR) preparation. A single adiabatic inversion pulse is generated upon detection of the cardiac R-wave to trigger the multi-phase readout. Each image (i.e., cardiac phase) is at a progressively longer TI time; up to 30 TI times can be captured. Cine IR can be used to approximate the myocardial null point for a subsequent delayed enhancement (MDE) study for myocardial viability.</p>
1	S7505YN	<p>Discovery/Optima Applications Pak-7</p> <p>The Applications Pak 7 includes the following:</p> <ul style="list-style-type: none"> • IDEAL and Flex • PROPELLER 3.0



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Qty	Catalog No.	Description
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- TRICKS
- Enhance with Delta Flow
- Cube
- Ready Brain
- eDWI

IDEAL

Generate consistent tissue contrast and reduce the number of series in an exam with IDEAL. The IDEAL acquisition and reconstruction methods can generate a water-only, fat-only, in-phase and out-of-phase data sets for clear tissue differentiation in a single series. In addition susceptibility artifacts common to MR imaging such as incomplete or inaccurate fat saturation, and chemical shift can be eliminated as well. The IDEAL application acquires multiple echoes and uses unique reconstruction routines to generate the four image contrasts and correct for errors due to tissue susceptibility. IDEAL is ideally suited for imaging anatomical regions such as the brachial plexus, neck, spine, chest, foot, ankle, and axilla where inhomogeneous magnetic fields may yield failures with traditional fat saturation techniques. IDEAL is compatible with Fast Spin Echo, 3D Gradient Echo and parallel imaging.

For fast T1w multi-phase imaging of the abdomen and pelvis, LAVA Flex acquisition uses 2D ARC parallel imaging to reduce artifacts from breath hold misregistration and incorrect FOV placement while providing up to four types of T1w-based tissue contrasts: water-only, fat-only, in-phase and out-of-phase. LAVA Flex requires LAVA which is included in the Express Exam ScanTools and is standard with the MR750, MR450, and MR450w system.

For fast T1w multi-phase imaging of the breast, VIBRANT Flex acquisition uses 2D ARC parallel imaging to enable higher acceleration factors over ASSET parallel imaging, and reduce artifacts from breath hold misregistration and eliminates artifacts due to incorrect FOV placement, while providing up to four types of T1w-based tissue contrasts: water-only, fat-only, in-phase and out-of-phase. VIBRANT Flex requires VIBRANT, which must be purchased separately.

The IDEAL method is compatible with ASSET and ARC parallel imaging and is optimized based on the anatomy of interest.

PROPELLER 3.0

PROPELLER 3.0 uses an innovative k space filling technique and post processing algorithms to help reduce and correct for motion and minimize magnetic susceptibility artifacts. Radial k space filling pattern causes oversampling of the k space center, generating more SNR and providing excellent tissue contrast. Radial k space filling is inherently less sensitive to motion compared to the Cartesian method. In addition, a sophisticated motion correction post-processing algorithm is deployed to reduce effects of motion originating from CSF flow, breathing, patient tremor or voluntary movements. PROPELLER 3.0 has been enabled for all



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anatomies, and T1 FLAIR, T2, T2 FLAIR, DWI as well as PD contrasts in all planes.

TRICKS

TRICKS (Time Resolved Imaging of Contrast Kinetics) provides high resolution multi-phase 3D volumes of any anatomy for fast accurate visualization of the vasculature. With segmented complex data recombination, TRICKS can accelerate 3D dynamic vascular imaging without compromising spatial detail. TRICKS also uses elliptic centric data collection for optimized contrast resolution and auto-subtraction for optimized background suppression. The result is time course imaging that does not require timing or triggering, provides high temporal and high spatial resolution, and enables the extraction

of optimum phases of data. As a result, TRICKS enables reliable, high quality vascular imaging.

TRICKS is compatible with surface coils and supports parallel imaging for even higher temporal resolution.

Inhance (Inherent Enhancement) Suite Non-Contrast MRA

The Inhance application suite consists of several sequences designed to provide high-resolution images of the vasculature with short-acquisition times and excellent vessel detail. These sequences include:

Inhance Inflow IR: Inhance Inflow IR is a new angiographic method, which has been developed to image renal arteries with ability to suppress static background tissue and venous flow. This sequence is based on 3D FIESTA, which improves SNR, as well as produce bright blood images. A selective inversion pulse is applied over the region of interest, which inverts arterial, venous, and static tissue. At the null point of the venous blood, an excitation pulse is applied to generate signal. The net result is an angiographic image with excellent background suppression and without venous contamination. Uniform fat suppression is achieved using a spectrally selective chemical saturation (SPECIAL) technique to provide uniform fat suppression, while respiratory gating compatibility reduces respiratory motion artifacts during free-breathing renal exams.

Inhance 3D Velocity: Inhance 3D Velocity is designed to acquire angiography images in brain and renal arteries with excellent background suppression in a short scan time. By combining a volumetric 3D phase contrast acquisition with parallel imaging, efficient k-space traversal, and pulse sequence optimization, Inhance 3D Velocity is faster than previous generations and is capable of obtaining complete neurovascular imaging in 5-6 minutes. Furthermore, background suppression is improved by the optimized pulse sequence design, resulting in better visualization of small branches. Respiratory trigger is also compatible with 3D Velocity to enable abdominal angiography, especially renal arteries. The result is the Inhance 3D Velocity technique offers improved productivity and image quality.

Inhance 3D DeltaFlow is a 3D non-contrast enhanced MRA application for peripheral arterial imaging. Inhance 3D DeltaFlow is based on the 3D Fast Spin Echo technique and it utilizes the systolic and diastolic flow differences to help generate arterial signal contrast. A subtraction of



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		<p>the systolic phase from the diastolic phase images results in arterial only images, with good venous and background suppression. Interleaved acquisition and parallel imaging (ASSET) with optimized k-space trajectory helps reduce motion misregistration and improve vessel visualization respectively. In addition, with the use of partial-Fourier and coronal plane acquisition, the scan time is considerably reduced. Inhance 3D DeltaFlow is a robust 3D NCE MRA technique that provides excellent, high SNR visualization of peripheral arteries.</p> <p>Inhance 2D Inflow: The Inhance 2D Inflow pulse sequence is designed to acquire angiography images of arteries, which follow almost a straight path, i.e. femoral, popliteal, carotid arteries, etc. Arterial blood flow is faster during systolic phase and slows down during diastolic phase. Inhance 2D Inflow is designed to acquire data during systolic phase and offers the following:</p> <ul style="list-style-type: none"> • Optimized spatial saturation gap to improve fat suppression and background suppression. With this saturation gap optimization, higher views per segment (vps up to 48) could be used, resulting in significant scan time reduction. • Peripheral Gating that minimizes the pulsatile artifacts. • Optimized View Ordering to improve arterial signal. • ASSET acceleration compatibility to reduce scan time. <p>Cube 3D</p> <p>The Cube technology can eliminate multiple independent two-dimensional datasets with a single three-dimensional volume (or cube) of high resolution data to provide better image quality in shorter exam times. Compared to traditional 3D fast spin echo acquisitions, Cube uses a combination of optimized echo train pulses and ARC parallel imaging to reduce SAR, extend the duration of the acquisition echo train, and reduce the echo spacing. The system automatically adjusts the echo train flip angle amplitudes to provide optimized tissue contrast based on the specific tissue T1 and T2 characteristics and prescription parameters. To further reduce exam time and improve image quality, Cube is compatible with ARC self calibrating parallel imaging.</p> <p>Isotropic Cube datasets may be automatically reformatted from a single acquisition into any plane, without gaps, and with the same resolution as the original plane for improved anatomical review and tissue visualization. The maximum parallel imaging acceleration is dependent upon the surface coil in use.</p> <p>High resolution Cube data can be acquired with T1, T2, T2 FLAIR, or Proton density weighted tissue contrasts for neuro, abdominal, pelvic, and musculoskeletal imaging.</p> <p>Ready Brain</p> <p>Ready Brain automates scan prescription for brain exams, improving precision, repeatability and workflow. The steps involved are (A) Whole brain localizer with 3D slabs (B) Automatic detection of mid sagittal plane (C) 2D-registration of mid sagittal plane to high quality reference image (D) Computer transformations for standard axial, sagittal and coronal views and (E)</p>



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		<p>Prescribe views to GRx and scan automatically.</p> <p>eDWI</p> <p>The eDWI application includes the acquisition sequence and post-processing tools. It is designed to provide high signal-to-noise-ratio diffusion images of the brain and liver with short-acquisition time. Its multi-B feature is designed to provide measurement of apparent diffusion coefficient (ADC) map with reduced effect of perfusion. In addition, "3 in one" B value combining technique, applies diffusion weighting to all three gradients simultaneously, helping improve sensitivity. Built in tetrahedral feature applies four different diffusion weighing combinations of x, y, and z gradients simultaneously to acquire isotropic diffusion weighted images with high signal to noise ratio and shorter TE. Its smart NEX feature significantly reduces the acquisition time. Inversion recovery has been deployed to provide robust fat suppression.</p>
1	M7000EZ	<p>Flow Analysis 4.0</p> <p>Flow Analysis automates the review and analysis of gated phase contrast magnetic resonance (MR) images and generates a report for the referring physician. This version is available on the host computer</p> <p>Flow Analysis has an automated edge detection algorithm that propagates through all the phases of the cine phase contrast series.</p> <p>The flow analysis measurement tab displays a summary chart of peak velocities in addition to individual velocity results from each phase of the cardiac cycle. A background correction may also be applied which is particularly suited to slow flowing fluid such as cerebrospinal fluid.</p> <p>Customizable Macros are a feature of Flow Analysis 4.0. These Macros allow the user to quickly write a report specific to the patient being assessed with simple mouse clicks. The macros are customizable to reflect the language used by the reporting physician.</p> <p>Flow Analysis offers the capability to archive reports or cine images as seen in a DICOM format so they may be viewed on any DICOM viewer.</p>
1	M7000LK	<p>MR450w GEM Suite - Core Components</p> <p>The Geometry Embracing Method (GEM) Suite of surface coils and accessories improves image quality and patient comfort while simplifying workflow for the operator. The GEM design ensures that the geometry of the surface coil matches the geometry of the patient. By matching size and shape of the coil with the size and shape of the patient, the GEM Suite embraces the natural shape of the anatomy thus improving image quality and patient comfort. In addition, the GEM Suite is fully integrated into the Express Patient Table and provides a simple method for the operator to prepare each patient with minimal effort and maximum productivity.</p> <p>The core components of the GEM Suite include the fully integrated Posterior Array, the Head and Neck Unit, and the Large Anterior Array. Each component of the GEM Suite may be used</p>



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individually or combined together to increase anatomical coverage. The GEM Suite of surface coils is used with the fully detachable GEM Express Patient Table. This combination of technologies can dramatically simplify technologist and radiographer workflow and enables the patient to be positioned head-first or feet-first for all exams.

GEM Posterior Array: The GEM Posterior Array (PA) is designed to provide optimum element geometry for each targeted anatomy. Unlike matrix arrays that use the exact same coil element size and shape for all anatomy, the GEM PA uses different element geometries for the cervical-to-thoracic spine transition, thoracic and lumbar spine, and body and cardiac anatomy. This approach maximizes signal-to-noise by matching the size and shape of the coil elements to the size and shape of the targeted anatomy. Four different sizes and shapes of elements are used throughout the design, and parallel imaging is supported in all three planes.

The GEM PA is symmetrically positioned within the patient cradle and is fixed in location. This design enables all components of the GEM Suite to support either head-first or feet-first patient orientation to support either patient preference.

The GEM PA is invisible to additional surface coils when they are placed directly on top of the surface. Unique electronic decoupling circuits ensures there is no electrical interference between surface coils. This feature is critically important for patient and operator workflow and enables the PA to be stationary for all exams, including breast and musculoskeletal exams where dedicated coils are typically used for these anatomies.

PA Coil Specifications:

- S/I Coverage: 100cm.
- Head or Feet-first imaging.
- Elements: 40.

The GEM PA Array is designed to be used in conjunction with the GEM Head and Neck Unit, the Large Anterior Array, the Small Anterior Array (purchased separately) and the GEM Peripheral Vascular Array (purchased separately). In addition, the PA may co-reside with a suite of flexible coils or dedicated anatomy-specific coils (each purchased separately). Additional GE PA coils may be purchased for use in additional patient tables.

GEM Head and Neck Unit and Comfort Tilt: The GEM Head and Neck Unit (HNU) is a standard component of the GEM Suite. The HNU consists of four imaging components, a HNU Base Plate and three anatomy-optimized anterior components. The inclusion of separate anterior components ensure that the geometry of the surface coil matches the geometry of the patient to improve both image quality and patient comfort. The three anterior components are the Neuro Vascular

Array, a dedicated Cervical Array, and the Open Face Adapter.

The HNU Base Plate supports the patient's head and includes three rows of elements separated in both the superior/inferior and right/left dimensions. Any of the three separate anterior arrays



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may be connected to the Base Plate.

The Comfort Tilt is a variable-degree ramp that may be positioned under the HNU. The Comfort Tilt can elevate the superior end of the coil to match the curvature of the patient's head and thoracic spine angulations. The operator may easily adjust the angle of tilt with a single motion.

The HNU Base Plate, Comfort Tilt, and any of the anterior components may be positioned at either end of the GEM Express Patient Table to support head-first or feet-first imaging. The HNU Base plate may remain in place for all body, vascular, spine, and the majority of musculoskeletal exams for either patient orientation.

GEM Head and Neck Unit Coil Specifications:

- Length: 49.5 cm (19.5 in).
- Width: 38.8 cm (15.3 in).
- Height: 36.8 cm (14.5 in).
- Height: 33.6cm (13.2in) with Cervical Array.
- Height: 25.7cm (10.1in) with Open Face Adapter.
- Weight: 8.8kg (19.4 lb).
- S/I Coverage: 42 cm.
- R/L Coverage: 50 cm.
- Head or feet-first imaging.
- Elements: up to 28 elements in the Field of View.

GEM Anterior Array: The GEM Anterior Array (AA) is a standard component of the GEM Suite that facilitates chest, abdomen, pelvis, and cardiac imaging. The GEM AA is lightweight, flexible, thin, and pre formed to conform to the patient's size and shape. With 54 cm of S/I coverage, the coil permits upper abdominal and pelvic imaging without repositioning the patient.

GEM Anterior Array Specifications:

- Length: 56.2 cm (22.1 in).
- Width: 69.8 cm (27.5 in).
- Height: 4.4 cm (1.7 in).
- Weight: 2.4 kg (5.3 lb) resting on patient.
- Weight: 3.6 kg (7.9 lb) with cable.
- S/I Coverage: 54 cm.
- Head or feet-first imaging.
- Elements: up to 36 elements in the field of view when used with the GEM Posterior Array.

1 M7000FY

MR450w 1.5T GEM Small Anterior Array

The GEM Small Anterior Array is a receive-only, high-density RF coil designed to produce images



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		<p>with optimal signal to noise ratio and uniform coverage for cardiovascular, pulmonary, renal, and abdominal imaging. The light-weight coil design contains 16 channels, with parallel imaging capability in all three dimensions to speed up high-resolution, breath-held, and free breathing cardiovascular exams.</p> <p>The Small dimension of the coil and coil elements provide optimal specifications:</p> <ul style="list-style-type: none"> • Length: 45 cm (17.7 in). • Width: 40.5 cm (15.9 in). • Height: 4.5 cm (1.8 in). • Weight: 2.94 kg (6.5 lbs). • S/I Coverage: 27 cm (10.6 in). • R/L Coverage: 35 cm (13.8 in). • Head-first or feet-first imaging. • Up to 33 elements in the FOV, when combined with the GEM PA.
1	M7000AT	<p>1.5T 3-Channel Shoulder Array - GE Coils</p> <p>The 1.5T 3-channel Shoulder Array offers the increased signal-to-noise characteristic of phased-array technology, along with a unique sleeve design that delivers exceptional joint-imaging capabilities. The coil provides clear definition of the shoulder joint, specifically the head of the humerus, clavicle, acromion, supraspinatus muscle and ligaments. Patient comfort pads and restraining straps are included.</p>
1	M7000SC	<p>1.5T GEM Flex Suite, Standard - P Connector</p> <p>The GEM Flex Suite is a versatile set of high density 16-channel receive coils designed to give high quality images in a wide range of applications. The high degree of flexibility is particularly advantageous when imaging patients that do not fit the constraints of rigid coils, improving the patient and technologist experience. Consistent with the GEM philosophy, the size and shape of the elements in each flex coil have been optimized for high SNR and parallel imaging for the volume embraced by the coil.</p> <p>This Standard set provides the Medium and Large flex coils, and a knee stabilization fixture that is designed for compatibility with the Express patient table with GEM. With these two coils and the included accessories, this suite covers a broad range of musculoskeletal applications, including hand, wrist, elbow, shoulder, hip (unilateral and bilateral), knee, ankle, and foot. In addition, the coils' versatility has been shown in a range of general purpose applications that include head, neck, and spine exams.</p> <p>Includes:</p> <ul style="list-style-type: none"> • 1.5T GEM Flex Coils - Medium and Large Arrays. • 1.5T GEM Flex Interface Module 16-channel Fixed, P-Connector.



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1	M7000SD	<ul style="list-style-type: none"> • GEM Flex Knee Stabilization fixture for flat table. • GEM Flex GP Strap and Interface Module Cover. • GEM Flex Cable Take-up Pad and General Purpose Stabilization Pad. <p>1.5T Small Flex Coil with Interface - P Connector</p> <p>The Small Flex Coil is the smallest of a versatile set of high density 16-channel receive coils designed to give high quality images in a wide range of applications. The smallest of these three coils is optimized for the reduced field of view and improved image quality needed in hand, wrist, and elbow imaging applications. Together with an extra interface assembly, this coil is ideal for MR sites doing a higher volume of musculoskeletal scans.</p> <p>The high degree of flexibility is particularly advantageous when imaging patients that do not fit the constraints of rigid coils, improving the patient and technologist experience, and enabling most exams to be completed with the same level of image quality expected from dedicated coils.</p> <p>The Small Flex Coil is compatible with the Discovery MR450 and Optima MR450w systems with the standard Express Patient Table and also with the MR450w systems with the GEM Express Patient Table.</p> <p>Includes:</p> <ul style="list-style-type: none"> • 1.5T Small Flex Coil. • Flex Interface Module 16-channel Fixed, P-Connector. • Flex Interface Module Cover.
1	E9200AF	<p>MR Accessories Kit</p> <p>The Accessories Kit combines a physician's chair, a complete set of positioning pads, and a set of Velcro security straps.</p> <p>The Physician's Chair has padded arms for comfort and comes in a charcoal gray color that blends with any environment.</p> <p>The MR Accessories Kit contains a complete set of coated positioning pads in a lightweight tote case that can be a permanent fixture in an MR suite or can be easily carried from room to room. The following pads are included: 1 knee rest, 1 knee coil insert, 1 extremity rest, segment table pads, 4 body wedges, 4 rectangle stack pads, and 2 rectangle elbow pads.</p> <p>The Velcro Security Straps include one 14 inch wide set and one 6 inch wide set.</p>
1	E8823M	<p>Magnacoustics Genesis ULTRA Communication & Music System</p> <p>The Magnacoustics Genesis ULTRA is the only MRI Communication & Music System to interface directly with GE's MRI hardware and software. This allows software driven Auto Voice</p>



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Qty	Catalog No.	Description
		<p>Commands from GE's computer to be delivered directly into the patient's ears for breath-hold sequences. This same interface allows the Technologist to talk directly to the patient through the console Mic even while the scan is in progress. The Genesis ULTRA also features an exclusive Patient Ready Signal. By simply depressing a small button on the handheld control an audible and visual signal is transmitted to the Technologist indicating the patient's readiness for the scan to begin. This simple step streamlines the breath-hold exam which amounts to approximately 30% of all exams. Patient Handheld Volume and Media Selection Controls with Voice Feedback interface with an FM/AM stereo, CD player, and iPod interface. This distracts even the most apprehensive of your patients by allowing them to be in control of their own environment. Additionally, the Auto Gain feature automatically raises and lowers the volume level for the patient based on the Sound Pressure Level of the MRI. Magnacoustics also provides the only patented 8-driver transducer that provides the highest sound directly to the patients ears with the MagnaLink Headset System. This patented system includes a stethoscope-style headset with the MagnaPlug (replaceable earplug) that provides 29dB of attenuation and complies with GE Healthcare MR Safety Guide Operator Manual.</p> <p>The Genesis ULTRA's See-In-the-Dark GUI Electroluminescent Backlit Technologist Control Unit enhances operation in the normally low-lit MRI environment allowing the Technologist to operate the entire system with the touch of a button.</p> <p>The Genesis ULTRA includes an Integral interface for fMRI with built-in input for audio stimulation and output for responses...E</p>
1	E4504FM	<p>700 VA Partial System UPS - MR</p> <p>Tested with all MR system computers, the 700VA Partial System UPS provides reliable, clean, consistent power for the data processing portion of the MR imaging system. The use of the double conversion UPS enables the MR system data processing portion electronics to operate when there is a power anomaly or total power loss. Valuable data and the system operating software are protected, if there is an extended outage the UPS allows for an orderly shutdown of the system.</p> <p>FEATURES/BENEFITS</p> <ul style="list-style-type: none"> • True double-conversion, online technology provides reliable operation and uninterrupted glitch free power • Automatic frequency selection eases startup, i.e., 50 or 60 Hz compatible • Integral Electronic Static Bypass switch means zero transfer time • Improves user productivity, system reliability, reduces service costs and increases system uptime • Advanced Battery Management (ABM) software monitors / indicates battery health and improves battery service life



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Qty	Catalog No.	Description
		<p>SPECIFICATIONS</p> <ul style="list-style-type: none"> • Dimensions (H x W x D): 9.09" x 6.3" x 13.9" • Weight: 26 lbs. • Input Voltage Range: Single Phase 80-138 V • Input Frequency Range: 47-70 Hz • Rating: 700 VA / 630 W <p>COMPATIBILITY</p> <ul style="list-style-type: none"> • MR Systems <p>NOTES</p> <ul style="list-style-type: none"> • This is a partial system UPS - it covers only the computer, not the entire MR imaging system. After a power event portions of the system will have to be reset before operation can resume • Customer is responsible for rigging and arranging for installation with a certified electrician • ITEM IS NON-RETURNABLE AND NON-REFUNDABLE
2	E8803BE	<p>Physician's Chair with Padded Arms</p> <p>Physician's chair has padded arms for comfort and comes in a charcoal gray color that blends with any environment. Chair adjusts from 16.75 in. to 21 in. (42.5 cm x 53.3cm) and is only for use in the MR Control Room. Weighs 45 lbs.</p>
1		<p>Optima MR450w TIP Applications Optima MR450w 1.5T IB Options</p>
1	W0106MR	<p>TIP Discovery and Optima Family Training 10 Days Onsite Plus 10 Hrs TVA</p> <p>The TIP Training Choices program is designed for CURRENT GE customers WITHOUT HDx experience who purchase a Discovery or Optima system. Training is delivered onsite at the customer's facility and instructs students in start-up operation of the system and introduces participants to the system design, workflow, new options and clinical applications included. Extended TVA support ensures learners maintain performance over the long term.</p> <p>This training program must be scheduled and completed within 36 months after the date of product delivery.</p>
1		<p>MR750 3.0T eDWI-Tagging-Flow Discovery MR750 3.0T IB Options</p>
1	M7000JB	eDWI



Quotation Number: P3-C141063 V 20

Qty	Catalog No.	Description
		<p>The eDWI application includes the acquisition sequence and post-processing tools. It is designed to provide high signal-to-noise-ratio diffusion Images of the brain and liver with short-acquisition time. Its multi-B feature is designed to provide measurement of apparent diffusion coefficient (ADC) map with reduced effect of perfusion. In addition, "3 in one" B value combining technique, applies diffusion weighting to all three gradients simultaneously, helping improve sensitivity. Built in tetrahedral feature applies four different diffusion weighing combinations of x, y, and z gradients simultaneously to acquire isotropic diffusion weighted images with high signal to noise ratio and shorter TE. Its smart NEX feature significantly reduces the acquisition time. Inversion recovery has been deployed to provide robust fat suppression.</p>
1	M7000EZ	<p>Flow Analysis 4.0</p> <p>Flow Analysis automates the review and analysis of gated phase contrast magnetic resonance (MR) images and generates a report for the referring physician. This version is available on the host computer</p> <p>Flow Analysis has an automated edge detection algorithm that propagates through all the phases of the cine phase contrast series.</p> <p>The flow analysis measurement tab displays a summary chart of peak velocities in addition to individual velocity results from each phase of the cardiac cycle. A background correction may also be applied which is particularly suited to slow flowing fluid such as cerebrospinal fluid.</p> <p>Customizable Macros are a feature of Flow Analysis 4.0. These Marcos allow the user to quickly write a report specific to the patient being assessed with simple mouse clicks. The macros are customizable to reflect the language used by the reporting physician.</p> <p>Flow Analysis offers the capability to archive reports or cine images as seen in a DICOM format so they may be viewed on any DICOM viewer.</p>
1	M7000CH	<p>Cardiac Tagging</p> <p>With Cardiac Tagging, an even distribution of spatial saturation lines are applied across the myocardium in the FastCINE Gradient Echo pulse sequence to enable cardiac wall motion assessment. Cardiac Tagging allows the application of 1D diagonal stripes or 2D grid saturation pulses once per R-R interval immediately following the R-wave trigger. Resulting images demonstrate motion (or lack of motion) effects.</p>
1		<p>Rigging In MR450w NonProducts</p>
1		<p>ProPac Rig GE MR450w 1.5T MRI into Presbyterian Hospital Radiology \$9,950</p>



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Qty	Catalog No.	Description
1		Rigging Signa LX 1.5T MRI out NonProducts
1		ProPac Rigging GE Signa LX 1.5T MRI out of Presbyterian Hospital Radiology \$9,870 ^(A)

Quote Summary:

GE LX 1.5T Twinspeed (\$100,000.02)
 Total Quote Net Selling Price *\$1,362,070.53

(Quoted prices do not reflect state and local taxes if applicable. Total Net Selling Price Includes Trade In allowance, if applicable.)

*Total Price	\$1,362,071
Add: Trade in	(100,000)
	<u>1,462,071</u>
less: ^(A) Removal	(9,870)
MRI scanner	<u>\$1,452,201</u>

^(A) removal costs are separate line item in Capital Costs summary



Attachment B

PROPOSED CAPITAL COSTS

Project Name: **Replace MRI Scanner**

12-Apr-12

Proponent: **Presbyterian Hospital (Novant Health, Inc.)**

A. Site Costs

(1)	Full purchase price of land		\$	N/A
	Acres _____ Price per Acre		\$	N/A
(2)	Closing Costs		\$	N/A
(3)	Site Inspection and Survey		\$	N/A
(4)	Legal fees and subsoil investigation		\$	N/A
(5)	Site Preparation Costs	\$		
	Soil Borings	\$		
	Clearing Earthwork	\$		
	Fine Grade For Slab	\$		
	Roads Paving	\$		
	Concrete Sidewalks	\$		
	Water and Sewer	\$		
	Footing Excavation	\$		
	Footing Backfill	\$		
	Termite Treatment	\$		
	Sub-Total Site Preparation Costs		\$	N/A
(6)	Other (specify)		\$	N/A
(7)	Sub-Total Site Costs		\$	0.00

B. Construction Contract

(8)	Cost of Materials			
	General Requirements	\$		
	Concrete/Masonry	\$		
	Woods/Doors & Windows/Finishes	\$		
	Thermal & Moisture Protection	\$		
	Equipment/Specialty Items	\$		
	Mechanical/Electrical	\$		
	Other	\$		
	Sub-Total Cost of Materials		\$135,000.00	\$ -
(9)	Cost of Labor GC Labor		\$202,500.00	\$ -
(10)	Other -			\$ N/A
(11)	Sub-Total Construction Contract		\$337,500.00	\$ 337,500.00

C. Miscellaneous Project Costs

(12)	Building Purchase			\$ N/A
(13)	Fixed Equipment Purchase/Lease		\$	1,452,201.00
	Other (Old Equipment Removal)		\$	9,870.00
(14)	Movable Equipment Purchase/Lease		\$	N/A
(15)	Furniture		\$	N/A
(16)	Landscaping		\$	N/A
(17)	Consult Fees			
	Architect and Engineering Fees	\$	\$22,500.00	
	Legal Fees	\$	N/A	
	Market Analysis	\$	N/A	
	Other (Contingency)	\$	36,000.00	
	Sub-Total Consultant Fees			\$ 58,500.00
(18)	Financing Costs (e.g. Bond Loan, etc)		\$	N/A
(19)	Interest During Construction		\$	N/A
(20)	Other (IT)		\$	2,000.00
(21)	Sub-Total Miscellaneous		\$	1,522,571.00
(22)	Total Capital Cost of Project (Sum A-C above)		\$	1,860,071.00

Attachment C



April 03, 2012

Mr. Craig Smith, Chief
Certificate of Need Section
Division of Health Service Regulation
701 Barbour Drive
Raleigh, NC 27603

Re: Presbyterian Hospital Main - MRI Scanner

Dear Mr. Smith:

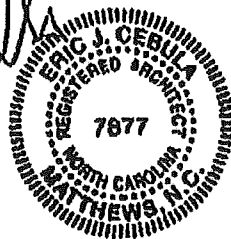
Ec,a Architecture has reviewed the proposal submitted by Revels Contracting Services, Inc. for the remedial construction of a 1300 square foot MR suite in the existing Presbyterian Hospital building in Charlotte, North Carolina.

It is our opinion, that the scope of the work is adequate to complete the project as discussed and outlined by this proposal. Furthermore, the construction estimate of \$337,500 is reasonable, for the proposed scope of work for the project, when compared to other similar projects in North Carolina. The construction is estimated at \$337,500 and \$22,500 for A&E drawings for a total cost of \$360,000.

If you should have any questions regarding this project, please do not hesitate to contact me. Thank you.

Sincerely,

Eric Cebula, AIA



Ec,a Architecture, PC
Eric J. Cebula, AIA PO Box 30183 Charlotte, NC 28230
704.849.6748 (tel) 800.652.0689 (fax) 704.906.6752 (cell) erc-cebula@carolina.rr.com

Attachment D

Presbyterian Hospital – MRI Scanner	EXISTING EQUIPMENT	REPLACEMENT EQUIPMENT
Type of Equipment (List Each Component)	MRI	MRI
Manufacturer of Equipment	GE	GE
Tesla Rating for MRIs	1.5	1.5
Model Number/Name	Twinspeed	Optima
Serial Number	218465MR3	TBD
Provider's Method of Identifying Equipment (RRMC uses an internal numbering system to identify equipment.)	Internal Asset Numbering System	Internal Asset Numbering System
Specify if Mobile or Fixed	Fixed	Fixed
Mobile Trailer Serial Number/VIN #	n/a	n/a
Mobile Tractor Serial Number/VIN #	n/a	n/a
Date of Acquisition of Each Component	1/2002	TBD
Does Provider Hold Title to Equipment or Have a Capital Lease?	Title	Title to be held by PH upon Purchase
Specify if Equipment Was/Is New or Used When Acquired	New	New
Total Capital Cost of Project (Including Construction, etc.) <Use Attached Form for New Equip>	\$1,734,047	\$1,860,071
Total Cost of Equipment	\$1,602,118	\$1,452,201
Fair Market Value of Equipment	n/a	\$1,452,201
Net Purchase Price of Equipment	n/a	\$1,452,201
Locations Where Operated	PH Charlotte	PH Charlotte
Number Days In Use/To be Used in N.C. Per Year	365	365
Percent of Change in Patient Charges (by Procedure)	None	None
Percent of Change in Per Procedure Operating Expenses (by Procedure)	None	None
Type of Procedures Currently Performed on Existing Equipment	MR imaging	_____
Type of Procedures New Equipment is Capable of Performing	_____	MR imaging