Caisson Wagon Salient Characteristics

version 4 May 2026

Problem Statement:

The Old Guard's objective is to develop a prototype for a new Caisson Wagon that honors the historical and aesthetic integrity of the original design while integrating modern, sustainable, and humane solutions. The ideal prototype will be constructed with readily available, non-obsolete components to ensure straightforward and cost-effective repair and maintenance. Furthermore, it must incorporate contemporary wagon technology to enhance the comfort and safety of the horses, reducing the physical strain associated with pulling and stopping the wagons. This initiative aims to preserve a cherished tradition while ensuring its viability and ethical soundness for the future.

<u>Wagon:</u>

- Outward aesthetic shall match the original 1917 Caisson wagon design to the greatest extent possible while supporting modern upgrades. Key words include "durable", "robust", and "military" in appearance.
- Caisson must have six (6) brass or brass-appearing stars on either side of the caisson, as well as other similar brass adornments featured on the V1 and V2 wagons.
- The length of the caisson, limber box, and limber pole shall be 320" long
- Limber pole shall be approximately 165", or suitable for usage by a pair of wheel horses. The caisson shall not implement a limber concept for attachment to more than the two wheel horses.
- Limber box shall be approximately 50" long x 49" wide
- Limber box seat shall be approximately 24" in height
- Caisson shall be 115" length x 44" wide x 18" height, matching the historic height.
- Wheels shall be 55" in height

<u>Limber Design and Functionality:</u>

- Adjustability:
    - Problem: The Old Guard utilizes various horses in the wheel horse positions. The wagons we have been using are tedious or imprecise in the way we are able, to the greatest extent of our current knowledge, to make height adjustments to accommodate the different horse heights.
    - Context: The V1 limber had a mechanism to adjust the height of the limber to accommodate different horses' heights; this knowledge and function was lost over time. The V3 limber integrated an alternative design,

featuring adjustable height settings with the ability to adjust and lock into positions between 33" to 47" from the ground (measured from the end of the limber pole) to account for different horse heights. The adjustment increments are currently 1.5” (measured at the limber pole fulcrum) on the V3 limber, which is often too large of a gap to best accommodate all horse heights.

- Requirement: The wagon must be suitable for horse pairs ranging between 15.3hh – 17.3hh (measured from the end of the limber pole), be precise, and relatively easy to change the height.

- Detachment:
  - Problems: The caisson wagon fully assembled is too long to transport in a 24” enclosed trailer.
  - Context: We transport the wagon regularly in a 24” enclosed trailer. The current fully assembled wagon has a high probability of becoming damaged. The V1 and V2 pole is detachable, secured with one pin when assembled. The V3 uses two (2) pins to remove the pole. When the pole is removed from the V3, it changes the height adjustment and creates extra challenges when reassembled.
  - Requirement: The limber may need to detach from the caisson wagon at the support hitch or at the support hinges. The wagon needs to have the ability to swivel left, right, up, and down separately from the Caisson with turns and hills. The wagon needs to fit into the 24” enclosed trailer without damaging the wagon or the trailer.
- Seat:
  - Problem: Low quality material on the limber seats make repairs necessary more often and are more difficult to maintain a professional aesthetic. Seats of current models lacking a secure attachment became loose at inopportune times. Seats secured in awkward places make it difficult to remove when needed.
  - Context: Previous versions have limber seats that are not sturdy and are difficult to repair in place. The seat on the V2 is detachable and facilitates ease of repair; however, it is not stable because it does not secure to the limber nor is of a design that keeps the seat in place. The V3 has bolts holding the seat onto the limber, which provides stability. However, the design makes it difficult to repair in place, and it is not easy to remove for repairs.

    - Requirement: Limber seat needs to be secure when attached to the wagon, must be made of durable material that is easy to clean and maintain, and designed so that it is easy to make repairs when required.

- Spreader Bar:
    - Problem/Context: The V1, V2, and V3 wagons were initially set up with a whippletree configuration, which was heavy and awkward to handle and attach. When the tack set up was changed to a more comfortable and ergonomic gear that aligned better with horse welfare, the whippletree configuration no longer worked with the setup but a spreader bar instead.
    - Requirement: Each wagon shall come with two spreader bars. Spreader bars shall be easily connected to the limber pole.

- Limber Pole:
    - Problem: Since the limber pole runs all along the sides of the wheel horses, it is most affected by wear and tear such as paint chips and dents and would be the most common and probable cause of injury to horses and riders.
    - Context: Originally the limber poles were painted, but after only a few missions would have paint scratches, dings, and dents, requiring paint touch ups very frequently to maintain the pole looking professional, which requires time that is better used on other missions. Additionally, the bare metal often rubs or bumps horses and riders, mostly causing superficial injury, but in cases of accidents could cause greater injury. To help with both issues, limber pole covers were implemented. Versions included thick black leather, padded black leather, padded faux leather, etc, which all helped with both issues of maintenance and preventing injury. Covers made with less durable materials were more difficult to maintain a sleek aesthetic and tore easily.
    - Requirement: Each wagon shall come with two limber poles – potentially one straight and one with a bend/curve/dip to avoid the rider's leg, if two (2) different limber poles are part of the Offeror's proposed solution. The limber needs to have a detachable, cleanable, durable soft wrap or cover made of material such as leather, padded faux leather, etc, to help prevent horses and riders from injury and rubs from bare metal.

- Limber Box:
    - Problem: Caisson teams enter Arlington National Cemetery (ANC) for the morning mission and remain in ANC until after the afternoon mission is

complete, a total of about 4 hours in the cemetery. Caisson teams must carry all cleaning supplies, ceremony needs, and extra gear with them throughout the mission. The metal limber box is currently used to hold these materials and is loud when the items move around in the box, negatively impacting the somber mood of the missions. The limber box is not weather resistant and the items in the box are affected by environmental factors that can damage the items stored.

- Context: The original wagons were designed to haul heavy ammunitions and had an interior honeycomb structure to hold the rounds; the weight and structure would quiet the ride and weather resistance was unnecessary. The interior honeycomb structure was removed to store items for current purposes, which increased the noise, and now the stored items can shift inside. Sound dampening materials were added to help with the noise issue.
- Requirement: A storage space on the wagon with a minimum of 20 cubic feet and a minimum depth of 12 inches that is weather resistant and sound dampening so contents cannot be heard while wagon is moving. The storage space must be secure when closed.

<u>Caisson Wagon Design and Functionality:</u>

- Wheel Design:
  - Problem: Steel bands wrapped around the wooden wagon wheels (iron tires) on original versions are loud. The noise produced affect the somberness of burial ceremonies and has the potential to spook horses.
  - Context: The V3 tires were made with solid rubber and provided a much quieter drive but are narrower and somewhat unstable when in motion with the wagon. The steel tires were replaced on old wheels with rubber, which quieted the ride while keeping the more stable nature of the wider wheels.
  - Requirement: Wheels shall be durable, with a tread that aids in dampening the sound of the wagon noise while being driven on pavement while still maintaining the historic aesthetic of the original 1917 Caisson model.
    - Wheels shall be 55” tall and spoked.
    - Tread shall have minimum vertical thickness of 1” that will aid in durability of function, so that the need for replacement is decreased.

    - Minimum of 3” wide wheels are used.
    - Hubs shall not protrude excessively from the wheel and have the outward appearance of brass.
    - Provide one spare wheel for each wagon. If the limber and caisson wheels differ, provide one spare of each size wheel per wagon.

- Reducing Strain on Horses while Caisson Wagon is Not Moving:
    - Problem: Need to reduce the strain on horses while caisson wagon is not moving.
    - Context: Horses stay hitched to Caisson Wagons between ceremonies. Horses are tied to hitching posts between ceremonies that are not level and so the potential for the weight of the caisson on a slope affects horses even when resting. No personnel ride on the limber box during ceremonies.
    - Requirement: Solution should not be visible to casual observers.
- Reducing Strain on Horses while Caisson Wagon is Moving Downhill:
    - Problem: Need to reduce load and strain on horses while moving downhill.
    - Context: ANC has several steep grades the wagon traverses. When going down hill, all the stopping/slowing power is done by only the two (2) wheel horses and the caisson wagon’s weight places strain and load on the breeching of those two (2) horses. On the original wagon, there was a handbrake that the personnel riding in the limber would engage to reduce the weight of the load. During current missions, no personnel ride on the limber box during missions. Therefore, a solution implemented in the design needs to be automatic, engaged without personnel involvement, or able to be engaged by one of the riders from their riding position.
    - Requirement: Solution shall not be outwardly visible while reducing the load and strain on horses when moving downhill.
- Casket Rollers: Wagon shall have casket rollers to ease loading and unloading of the casket, protect the top of the wagon, and the bottom of the casket.
- Casket straps: Wagon shall have straps to secure the casket once emplaced for transport, that will be easy to afix and unafix within the current ceremonial structure.
- Caisson Box: The caisson box shall have a protective cover on top edge of the back of the Caisson to protect the box from being damaged in the process of

loading a casket. Additionally, caisson box shall have a holder for the stop clamp for storage when not in use.

- Caisson Kickstand: Kickstand shall be installed so that when the Caisson is detached from the limber box, the Caisson will be supported off the ground by the kickstand. The kickstand shall be able to be locked into position - both up when not in use and down when in use.
- Sign Hook: A hook to hang a sign off the back of the caisson wagon shall be emplaced underneath and towards the rear of the Caisson. The hook shall not be outwardly visible, but a sign hanging from the hook shall be visible to personnel behind the Caisson.

<u>Additional Wagon Considerations:</u>

- Materials: Frame and other structural components shall be constructed of powder-coated high-grade metal material, where applicable, such as the undercarriage of the caisson and limber, for durability. Outward aesthetic must match those as outlined in the previous models document and shall be constructed with high-grade metal material, besides wheels.
- Weight Limit: Overall weight shall not exceed 2000 lbs.
- Mileage: Wagon shall be able to sustain daily use and mileage of a minimum 10 miles per day @ 10 mph on 10% grade hills. Must be able to carry an 800lb casket.
- Maintenance Program/Lifecycle: Maintenance program is a written program the Government can follow and implement and shall cover a minimum of any moving or load bearing parts on the wagon (i.e. rollers, bearings, bolts, hubs, chassis, brakes, suspension, etc.). Provide a maintenance program based on age and mileage. Expectation is that the wagon lasts a minimum of 40 years with assistance of the maintenance program. Unit has access to wheeled vehicle mechanics, welders, leather workers, etc. Repair parts shall be easily resourced commercially.
- Hub Maintenance: Hubs shall be designed such that maintenance is roughly 1x per 6 months (other than necessary greasing).
- Load Distribution on Horses:
    - When stationary on flat ground: There shall be no load from wagon components on horses.
    - When moving forward on flat ground or uphill: Load shall be applied to the traces, with line of draft engaging horses' breast collar.

- When stopping, slowing, or going downhill: Weight of the load shall be minimized by an engineered solution, such as a braking system, with residual weight applied to the horses' breeching. The height of the limber pole shall be minimally affected by the stopping of the Caisson. The stopping of the caisson shall cause the limber pole to move in a downward motion.

- Odometer: Wagon shall include an odometer. Odometer shall not be outwardly visible.

Warranty: Explain the warranty, if any, being proposed by the Offeror. The explanation should include length of time and services or parts included.