HOWARD STEIN HUDSON

August 21, 2023

Mr. John Lee, Chairman
135 School Street
Walpole, MA 02081
United States

Re: Cedar Edge – Proposed Project Modification
Comprehensive Permit (40B) Peer Review
Walpole, Massachusetts

Dear Mr. Chairman:

Howard Stein Hudson (HSH) has reviewed the responses provided by Tetra Tech (TT) on August 15th, 2023. Herein, HSH offers the following responses to TT comments in **red** below.

Tetra Tech (TT) has reviewed various Project submittals in support of a requested modification of the approved plan to substitute for-rent apartment/townhouse units for single-family/duplex homes. The number of total units will remain at 268, however those units will be distributed over a much smaller development footprint which now includes a third multi-story building and a modified townhouse layout. Although we focused our review on those portions of the Project that have changed due to the modification, we have also revisited the design in its entirety given our last review was issued in February of 2021 on documents prepared in January of 2021 and did not include detailed review of any subsequent submittals including those approved by the Board in its Revised Decision or reviewed/approved by any other board or department.

To assist the Board with distinguishing between clearly "Modification-Related" comments and others that are more general we show "Modification-Related" comments in *italicized font* and list them first in each section followed by our general comments.

Our review is based on materials received from the Board comprising the following:

- Letter dated June 7, 2023 from David Hale and Robert Hewitt requesting modification to the approved plans.
- A table dated June 6, 2023 summarizing proposed modification.
- A set of plans including 3 sheets titled "Revised Layout (Redline)", "Revised Layout", "Buffer Zone Use Reduction" dated June 6, 2023 prepared by Howard Stein Hudson (HSH).
- An architectural plan set titled "Cedar Crossing – Multi-Family: Building 3" dated May 26, 2023, prepared by CNK Architects, Inc. (CNK).
- Cover letter dated June 20, 2023 prepared by HSH.
- Plan set titled "Site Plan for Proposed Multifamily Development, Walpole, MA", dated June 20, 2023, prepared by HSH.

- A "Supplemental Data Report – Proposed Multi-family Development 51-53-55 Summer Street Walpole, Massachusetts" dated June 2023 prepared by HSH.
- A set of plans including 9 sheets titled "Truck Turning Plan" dated June 20, 2023 prepared by Howard Stein Hudson (HSH).
- A memorandum dated December 17, 2020 prepared by Raymond Willis, of Onsite Engineering Inc. summarizing the preliminary design of the sewage collection system.
- A memorandum dated July 24, 2023 prepared by Raymond Willis, of Onsite Engineering Inc. providing "Sewer and Water Demand Updates" resulting from the proposed modification.
- Letter dated July 24, 2023 prepared by Bayside Engineering addressing anticipated traffic changes resulting from the proposed modification.

The Plans and accompanying materials were reviewed for good engineering practice, overall site plan efficiency, stormwater, utilities, traffic, and public safety. The plans and supporting materials were competently prepared and accurately depict the proposed modification and associated infrastructure changes.

The documentation clearly demonstrates the proposed modification will result in less impact than the currently Approved Plan. We offer the following comments for consideration by the Board as well as the applicant and its design team.

Site Plans

Cover Sheet (Sheet C.1)

1. General Note 2 indicates sheets C6 - C10 are provided for "reference only" and refers to stamped plans prepared by Legacy Engineering that are not included in the set or the resubmission materials. We recommend the Legacy Plans be provided as a separate submittal with appropriate professional endorsements or the "reference only" sheets be replaced with the stamped plans from Legacy Engineering.

   Applicant: Stamped Existing Conditions Plans by Legacy Engineering will be provided.

Site Plan Notes (Sheets C.2 - C.4)

These sheets were not reviewed as they contain no design content.

Locus Plan (Sheet C.5)

We would typically consider this sheet a "Key Plan" or "Sheet Index Plan" as opposed to a Locus Plan which typically shows the site in context with surrounding community/region similar to the "Locus Map" provided on the Cover Sheet.

Applicant: The nomenclature of this sheet and the detail provided within it has remained the same as the previous approval.

Existing Conditions Plan (Sheets C.6 – C.10)

2. Suggest these plans include a reference to content source (ie. Legacy plans referenced on Sheet C.1 and/or wetland ORAD) and be stamped by the party responsible for the sheet.

   Applicant: The Existing Conditions Plans will be stamped and provided.

Proposed Subdivision/Overall Plan (Sheet C.12)

3. *Given the change has eliminated the single-family homes we recommend re-titling this sheet to "Proposed Overall Plan".*

   Applicant: The sheet can be re-titled as suggested above.

Open Space and Recreation Plan (Sheet C.13)

4. *Recommend the south access trail be extended to connect with proposed Driveway A since the connecting roadway has been eliminated.*

   Applicant: This proposed trail connection can be extended from where it is currently proposed to the maintenance berm of the newly proposed infiltration pond #3 like how it was depicted in the approved plans if approved by the conservation commission.

5. *The Plan shows a proposed parking ratio of just over 1.88 spaces per unit consistent with Comprehensive Permit Condition. However, given some of the spaces currently shown may not meet minimum size requirements (minimum offset to sidewalk) or lack proper access (see parallel spaces at end of Driveway A) modifications to address those issues may be required to meet 1.88 space/unit requirement.*

   Applicant: All parking spots will meet the dimensional requirements per condition F.5 and a minimum parking ratio of 1.88 spaces / unit will be maintained.

6. *Sheet includes very little information on open space/recreation amenities and far more content related to the revised parking summary. Recommend the sheet title be revised to "Open Space, Recreation and Parking Plan" and modified to address other comments noted in this section.*

   Applicant: The proposed sheet will be renamed.

7. Provide labels identifying Lot 1 and Lot 2 so lots can be identified without referring to other sheets.

   Applicant: The proposed lot labels will be added.

8. Recommend access trail at the northeast corner of the development be extended to connect with the sidewalk in front of Building 1000 to create a connected loop.

   Applicant: The remainder of the trails are not proposed to be moved from the previous approval. It is worth noting that these trails are not maintained by the property owner and are not and cannot be made ADA.

Layout and Materials Plan

<u>Sheet C.14</u>

9. *The crosswalk north of the clubhouse is located behind and within a car length of the stop bar. We recommend this crosswalk be moved to in front of the stop bar.*

   Applicant: The proposed crosswalk will be moved as recommended above.

Sheet C.15

10. *Based on responses to Fire Department comments it was our understanding that the one-way direction of Driveway D was to be reversed. The plans show the direction away from Building 2000 instead of toward. Plan should be revised to reflect intended circulation.*

Applicant: The plans will be updated to reflect the direction change.

Sheet C.16

11. *The crosswalk at the Driveway D approach to Driveway A is located behind and within a car length of the stop bar. We recommend this crosswalk be moved to in front of the stop bar.*

Applicant: The proposed crosswalk will be moved to in front of the stop bar.

12. *The parallel configuration of the two visitor spaces east of the Driveway D/A intersection does not work given there is no turnaround provided. We recommend these spaces be modified to a 90-degree configuration.*

Applicant: These spaces will be removed and relocated elsewhere within the development.

13. Several of the Townhouse driveways appear to not be long enough to accommodate a vehicle without extending into the path of the sidewalk or travel way.

Applicant: All townhouse driveways will meet the length requirement as required per condition F.5 within the existing permit.

Sheet C.17

14. *It's unclear why Driveway A widens to 24' at the location shown when non-emergency access ends at the visitors spots near Driveway D. We recommend the emergency access road be a consistent 20' width to (1) reduce impervious surface, (2) reduce likelihood of illegal parking and (3) reduce culvert crossing length, unless otherwise requested by the Fire or Police Departments.*

Applicant: Starting to the West of the Driveway D/A intersection, the emergency access section of Driveway A will be reduced to 20' for the remainder of the Driveway till the connection back up at Summer Street.

15. *It's unclear where the concrete curb (cc) ends or how it transitions. Suggest that information be added to the plans along with a clarification of curb type. The details include "Cape Cod Berm/Curb" and "Vertical Bit Berm Curb" without a clear indication of which is intended by the "cc" callout. Please clarify on the plans.*

Applicant: Clarification will be added to the plans where necessary.

Grading and Drainage Plan

Sheet C.19

16. Test Pit 51 which borders on the Stormtech Infiltration System #2 (behind Bldg. 1000) indicates ESHGW at approximately 195.9 which is above the proposed system bottom at elevation 194.77 suggesting the system is located within groundwater. Recommend applicant clarify conditions by providing a summary table of the test pits results used to document compliance of each infiltration system including test pit surface elevation and Estimated Seasonal High Groundwater (ESHGW). Please note, the content on this sheet has changed from that shown on the Approved Plans but the changes were not directly related to the proposed modification and as such are considered general.

    Applicant: The location of the Stormtech Infiltration System #2 and testing have not changed since the approved plans. Additionally, at the time of installation, bed bottom inspections will need to be performed to confirm the soil underneath the system prior to final installation.

17. It would be helpful if the Stormtech Infiltration Systems were labeled (plans and details) with the labels used in the stormwater modeling.

    Applicant: Additional labels will be added to either the detail sheets or the HydroCAD Stormwater Modeling to aid in review.

18. The trench drain from Building 2000 discharges directly to the wetland without any water quality treatment. Based on our understanding of the stormwater standards and handbook some level of water quality treatment is required prior to discharge.

    Applicant: The orientation of the trench drain has remained the same since the current approval was issued. The supplemental data report goes through the weighted TSS average of treated to untreated stormwater and details our compliance with the stormwater handbook.

19. Stone armoring of emergency spillway from Infiltration Pond 2 stops mid-slope. We recommend the stone armoring extend to the base of the 3:1 side slope to minimize erosion risk at the interface.

    Applicant: The proposed Riprap will be extended to the base of the side slope.

Sheet C.20

20. *No test pit information is provided for Stormtech Infiltration System #3 (south of Bldg. 11000) from which soil characteristics or ESHGW can be determined. Please clarify how each was determined and how it complies with requirements of stormwater handbook.*

    Applicant: There are several pits in the area at equivalent elevations which were used to establish approximate SHWGW elevations within the area. Confirmatory pits will be performed at the time of installation along with bed bottom inspections to confirm the drainage design.

21. *The closest test pit information for Stormtech Infiltration System #4 (north of Bldg. 11000) is more than 30 feet away. Please clarify how soils and ESHGW information was determined and how it complies with stormwater handbook.*

Applicant: There are several pits in the area at equivalent elevations which were used to establish approximate SHWGW elevations within the area. Confirmatory pits will be performed at the time of installation along with bed bottom inspections to confirm the soil underneath the system prior to final installation.

Utilities Plan

22. *Pump station details were provided in the Approved Plans but are not included in the Revised Plans. We recommend the same level of information be provided on the Revised Plans as was shown on the Approved Plans.*

Applicant: The same level of detail which was provided on the Approved Plans will be provided and will be needed prior to construction.

23. *It appears that gas service is no longer proposed to serve the development. Please clarify what fuel is proposed for pump station emergency generators.*

Applicant: The fuel for the backup generator will be diesel and the storage tank will comply with the special permit requirements outlined in the zoning code section 12.3.C.6. Storage of liquid hazardous materials, as defined in M.G.L. c. 21E, and/or liquid petroleum products so long as the following criteria are met: (a) above ground level; and (b) on an impervious surface; and (c) either in container(s) or above ground tank(s) within a building or outdoors in covered container(s) or above ground tank(s) in an area that has a containment system designed and operated to hold either ten percent (10%) of the total possible storage capacity of all containers, or one hundred and ten percent (110%) of the largest container's storage capacity of the largest container's storage capacity, whichever is greater.

A typical fuel tank drawing and specification is attached at the end of this letter.

Landscaping Plan

1. The Landscaping Plans do not specify tree species by location nor provides a proposed tree/shrub count. For this plan to be of value we would expect to have specific tree species identified at each location and a proposed count provided on the planting table as is provided on Sheet C.33 for the entry planting.

Applicant: Landscape plan Sheet C.29 depicts planting quantities per symbol on the left-hand side of the sheet. This sheet also depicts the species palette which can be utilized in each symbol location. This matches the layout of what was depicted on the approved plans.

2. Planting Note 1 indicates the number of each plant is provided in the Plant List however that information is not included.

   Applicant: Refer to the response to Landscaping Plan comment #1.

3. Deciduous and Street Trees are proposed at 2-inch caliper which is relatively small in comparison to typical installations. While we have no technical objection to the proposed size, we call it to the Board's attention to inform its expectations.

   Applicant: A 2" caliper is the same caliper depicted on the approved plans.

Lighting Plan

4. *No lighting is proposed along the emergency access section of Driveway A. In our opinion this is an appropriate design decision.*

   Applicant: Acknowledged.

5. The Lighting Plan is intuitively understandable but lacks a means of differentiating among multiple light fixtures. The Plan indicates reasonable and adequate lighting coverage will be provided and shows that light poles will be 15'.

   Applicant: The label for the light fixture (for example P3) is placed next to each fixture within the plan which matches with the corresponding callout within the table.

Pavement and Curbing Details (Sheet C.40)

1. *The detail sheet calls out two different bituminous curb systems, but plans do not clearly indicate which is to be used and Accessible Curb Ramp details and Roadway Cross Sections include conflicting information. Based on our review it appears the intent is to use "Cape Cod Berm/Curb" in all locations other than when adjacent to a sidewalk in which case the curb will be cement concrete and integrally formed with the sidewalk as shown on the "Monolithic Concrete Curb and Walk" detail. Please confirm or otherwise note where intent is other than described.*

   Applicant: Additional clarification will be provided within the construction plans and details.

Drainage Structures (Sheet C.43)

2. The "3-sided culvert detail" provides no information on backfill, bedding or bottom construction which is typically provided. Suggest at least the information noted above be included in the detail.

   Applicant: Additional detail will be provided within the construction plans.

Stormtech Infiltration System Detail Sheet (Sheet C.55)

3. As noted in prior comment on Grading and Drainage Plan, the Stormtech Infiltration System #2 does not appear to have adequate separation from groundwater.

   Applicant: Refer to above response to comment.

4. The detail shows the Manifold header only 0.1 feet above the Isolator Row. If installed as shown, the isolator row would provide almost no useable storage as sediment could only accumulate in the isolator row to a depth of 0.05 feet before requiring removal to restore function. Recommend raising the Manifold to just below the inlet elevation of 196.98 to maximize available Isolator Row storage volume and effectiveness.

   Applicant: Per the ADS Stormtech Design Tool the isolator row is located with approximately a 0.1' drop from the isolator row to the remainder of the system. The following recommendation will be incorporated into the plans.

5. Detail appears to show building roof drains co-mingled with pavement runoff. Recommend roof drains be bypass the Isolator Row to reduce potential for bypass and sediment re-suspension.

   Applicant: This will be adjusted if the layout allows for it. Given the orientation of the systems and the drain locations, some situations may not be possible.

6. Recommend the system be given a unique identifier ideally matching the label used in the stormwater model and that it be noted on the plans and on the detail and in the detail sheet title block.

   Applicant: Additional labels will be added for easier review.

Stormtech Infiltration System Detail Sheet (Sheet C.56)

7. Recommend the system be given a unique identifier ideally matching the label used in the stormwater model and that it be noted on the plans and on the detail sheet title block.

   Applicant: Additional labels will be added for easier review.

8. The detail shows the Manifold header only 0.1 feet above the Isolator Row. If installed as shown, the isolator row would provide almost no useable storage as sediment could only accumulate in the isolator row to a depth of 0.05 feet before requiring removal to restore function. Recommend raising the Manifold to just below the inlet elevation of 204.0 to maximize available Isolator Row storage volume and effectiveness.

   Applicant: Per the ADS Stormtech Design Tool the isolator row is located with approximately a 0.1' drop from the isolator row to the remainder of the system. The following recommendation will be incorporated into the plans.

9. Detail appears to show building roof drains co-mingled with pavement runoff. Recommend roof drains be routed to bypass the Isolator Row to reduce potential for bypass and

sediment re-suspension.

Applicant: This will be adjusted if the layout allows for it. Given the orientation of the systems and the drain locations, some situations may not be possible.

Stormtech Infiltration System Detail Sheet (Sheet C.57)

10. As noted in prior comment on Grading and Drainage Plan, there appears to be no test pit documenting soil conditions or ESHGW beneath the infiltration system. Please provide documentation supporting the conclusion that the system has adequate separation from ESHGW and applicable RAWLS rate or equivalent.

    Applicant: There are several pits in the area at equivalent elevations which were used to establish approximate SHWGW elevations within the area. Confirmatory pits will be performed at the time of installation along with bed bottom inspections to confirm the soil underneath the system prior to final installation. The infiltration rate will be revised to 1.02 which corresponds with the Rawls Rate for Sandy Loam.

11. Recommend the system be given a unique identifier ideally matching the label used in the stormwater model and that it be noted on the plans and on the detail and in the detail sheet title block.

    Applicant: Additional labels will be added for easier review.

12. The detail shows the Manifold header only 0.1 feet above the Isolator Row. If installed as shown, the isolator row would provide almost no useable storage as sediment could only accumulate in the isolator row to a depth of 0.05 feet before requiring removal to restore function. Recommend raising the Manifold to just below the inlet elevation of 203.7 (North Side) and 202.57 (South Side) to maximize available Isolator Row storage volume and effectiveness.

    Applicant: Per the ADS Stormtech Design Tool the isolator row is located with approximately a 0.1' drop from the isolator row to the remainder of the system. The following recommendation will be incorporated into the plans.

Stormtech Infiltration System Detail Sheet (Sheet C.58)

13. As noted in prior comment on Grading and Drainage Plan, there appears to be no test pit documenting soil conditions or ESHGW beneath the infiltration system. Please provide documentation supporting a conclusion that the system has adequate separation from ESHGW and applicable RAWLS rate or equivalent.

    Applicant: There are several pits in the area at equivalent elevations which were used to establish approximate SHWGW elevations within the area. Confirmatory pits will be performed at the time of installation along with bed bottom inspections to confirm the soil underneath the system prior to final installation.

The infiltration rate will be revised to 1.02 which corresponds with the Rawls Rate for Sandy Loam.

14. Recommend the system be given a unique identifier ideally matching the label used in the stormwater model and that it be noted on the plans, details and in the detail sheet title block.

    Applicant: Additional labels will be added for easier review.

15. The detail shows the Manifold header only 0.08 feet above the Isolator Row. If installed as shown, the isolator row would provide almost no useable storage as sediment could only accumulate in the isolator row to a depth of 0.04 feet before requiring removal to restore function. Recommend raising the Manifold to just below the inlet elevation of 202.15 to maximize available Isolator Row storage volume and effectiveness.

    Applicant: Per the ADS Stormtech Design Tool the isolator row is located with approximately a 0.1' drop from the isolator row to the remainder of the system. The following recommendation will be incorporated into the plans.

16. Detail appears to show building roof drains co-mingled with pavement runoff. Recommend roof drains be bypass the Isolator Row to reduce potential for bypass and sediment re-suspension.

    Applicant: This will be adjusted if the layout allows for it. Given the orientation of the systems and the drain locations, some situations may not be possible.

Wetland Crossing Culvert (Sheet C.60)

17. The detail does not accurately depict proposed conditions and includes no information on backfill, bedding or bottom construction which is typically provided. Suggest the detail be modified to reflect proposed culvert alignment/geometry and to show details regarding proposed stream bottom construction.

    Applicant: Most of the crossing information is located within the plan set on Sheet C.59 which depicts the channel locations, culvert requirements, and construction sequence which provides a lot of what is requested above. If additional detail is needed it will be provided within the plans between Sheet C.59 and C.60.

Supplemental Data Report

18. Modeling analysis applies a range of pond exfiltration rates that is not adequately supported by the data provided. We recommend the analysis be simplified by using infiltration rates noted in Table 2.3.3 (1982 Rawls Rates) of the Stormwater Handbook corresponding to the most restrictive soil layer observed in applicable test pits. Our specific comments for each

pond are noted below.

a. Pond 204 - Stormtech Infiltration System #1: Applies a 0.66 in/hour exfiltration rate despite Test Pit 43A indicating underlying soils comprised of Sandy Loams. Recommend the analysis apply the 1.02 in/hour Rawls Infiltration Rate for Sandy Loam as provided in the Stormwater Handbook given the results of Test Pit 43A.

Applicant: As part of a thorough review process with BETA Group, Inc., it was determined that we would establish our infiltration rates on in situ site specific soil testing which was performed and witnessed by the town. These rates are provided within the supplemental data report and were the basis of the drainage design within the approved plans.

b. *Pond 205 - Infiltration Pond #3: Applies a 2.41 in/hour exfiltration rate (Type A soil) without clear justification and in contradiction to soils mapping provided and results of Test Pit 13 suggesting the pond is constructed in Type B soils. Recommend the analysis apply the 1.02 in/hour Rawls Infiltration Rate for Sandy Loam as provided in the Stormwater Handbook given the result of Test Pit 13.*

Applicant: The location of this pond has changed since there are no longer single-family houses being constructed in this area. The infiltration rate will be revised to 1.02 which corresponds with the Rawls Rate for Sandy Loam.

c. Pond 206 - Stormtech Infiltration System #2: Applies a 2.50 in/hour exfiltration rate apparently based on a falling head permeability test conducted near Test Pit 52 but disregarding results at Test Pits 51 and 53 showing lower exfiltration rates and consistent test pit results indicating underlying soils partly comprised of Sandy Loams. Recommend the analysis apply the 1.02 in/hour Rawls Infiltration Rate for Sandy Loam as provided in the Stormwater Handbook given the results of Test Pit 51-53.

Applicant: As part of a thorough review process with BETA Group, Inc., it was determined that we would establish our infiltration rates on in situ site specific soil testing which was performed and witnessed by the town. These rates are provided within the supplemental data report and were the basis of the drainage design within the approved plans.

d. Pond 207 - Infiltration Pond #2: Applies a 3.69 in/hour exfiltration rate apparently based on a falling head permeability test conducted near Test Pit 47 but disregarding results at Test Pit 50 showing lower exfiltration rates and test pit results consistently indicating underlying soils partly comprised of Sandy Loams. Recommend the analysis apply the 1.02 in/hour Rawls Infiltration Rate for Sandy Loam as provided in the Stormwater Handbook given the resultsof Test Pit 47-50.

Applicant: As part of a thorough review process with BETA Group, Inc., it was determined that we would establish our infiltration rates on in situ

site specific soil testing which was performed and witnessed by the town. These rates are provided within the supplemental data report and were the basis of the drainage design within the approved plans.

e. *Pond 212 - Infiltration Pond #1: Applies a 5.13 in/hour exfiltration rate apparently based on a falling head permeability test conducted near Test Pit 40 which is more than 100 feet away and disregarding results at Test Pits 2, 7, 36 that are within the system footprint and showing consistent results indicating underlying soils comprised of Sandy Loams. Recommend the analysis apply the 1.02 in/hour Rawls Infiltration Rate for Sandy Loam as provided in the Stormwater Handbook given the results of Test Pit 2, 7, 36.*

Applicant: As part of a thorough review process with BETA Group, Inc., it was determined that we would establish our infiltration rates on in situ site specific soil testing which was performed and witnessed by the town. These rates are provided within the supplemental data report and were the basis of the drainage design within the approved plans.

f. *Pond 213 – Stormtech Infiltration System #3: Applies a 5.13 in/hour exfiltration rate apparently based on a falling head permeability test conducted near Test Pit 40 which is more than 300 feet away and disregarding results at closer Test Pits 2, 7, 36 that are still not within the system footprint and showing consistent results indicating underlying soils comprised of Sandy Loams. Recommend the analysis apply the 1.02 in/hour Rawls Infiltration Rate for Sandy Loam despite not having data from within the system footprint given the consistency of soil testing showing Sandy Loams across the site.*

Applicant: The infiltration rate will be revised to 1.02 which corresponds with the Rawls Rate for Sandy Loam.

g. *Pond 214 – Stormtech Infiltration System #4: Applies an 8.28 in/hour exfiltration rate apparently based on a falling head permeability test conducted near Test Pit 41 which is more than 30 feet outside the system footprint and disregarding results at Test Pits 27 and 42 that are at a similar distance and show lower permeability results and uniformly indicating underlying soils partly comprised of Sandy Loams. Recommend the analysis apply the 1.02 in/hour Rawls Infiltration Rate for Sandy Loam despite not having data from within the system footprint given the consistency of soil testing showing Sandy Loams across the site and in test pits proximate to the system.*

Applicant: The infiltration rate will be revised to 1.02 which corresponds with the Rawls Rate for Sandy Loam.

19. None of the test pit data provided includes the recorded surface elevation making it extremely difficult to determine/validate design compliance with required system offsets to Estimated Seasonal High Groundwater (ESHGW). We recommend any future

presentation of test pit results include a reporting of test pit ground surface elevation and a calculated ESHGW elevation.

Applicant: The test pit data depicted on the plans is the same as those depicted on the approved plans. They do not have elevation callouts but can be referenced from the contour labels on grading sheets C.19-23.

20. The Long-Term Pollution Prevention includes a section on Isolator Row maintenance stipulating that sediment should be removed when accumulated sediment reaches a depth of 3 inches which is more than 1.5 inches above the distribution manifold and as such allows sediment to be discharged to the balance of the infiltration system. We recommend the manifold elevations be raised as described in earlier comments or a weir structure be added to provide at least 6 inches clearance above the bottom elevation of the Isolator Row.

Applicant: Refer to comment response above.

Truck Turning Plans

1. *The Truck Turning Plans demonstrate that the proposed roadway geometry and layout will provide adequate access for responding emergency vehicles. Additionally, the proposed Project modification eliminates several dead-end conditions which can complicate a response. Please note the 7/17/23 Revision of the Truck Turning Plans shows the proposed change in direction (west to east) of the one-way road between Building 2,000 and Building 11,000. The change is not reflected on the site plans pr the original version of the Truck Turning Plans.*

Applicant: Refer to comment response above. The one-way orientation will be reflected on the plans.

Traffic Letter (Bayside – July 24, 2023)

2. *We concur with the Project's assertion that the proposed modification will result in approximately 15% fewer vehicle trips despite maintaining the same number of total units since the for-rent apartment/townhouse units generate substantially fewer vehicle trips than the single-family homes they are proposed to replace.*

Applicant: Acknowledged.

3. *In addition, the proposed modification simplifies traffic circulation patterns by eliminating several intersections and driveways.*

Applicant: Acknowledged.

Sewer/Water Demand Memo (Onsite Engineering Inc. - July 24, 2023)

4. *We concur with the Project's assertion that the proposed modification will result in approximately 7% reduction in estimate water demand and wastewater generation despite maintaining the same number of total units since the for-rent apartment/townhouse units have fewer bedrooms than the single-family homes they are proposed to replace.*

   Applicant: Acknowledged.

In our opinion the proposed modification results in a net reduction in potential negative impact as it results in

(1) less impervious surface, (2) less traffic generation, (3) less water and sewer demand and (4) a simpler more efficient roadway layout. As such, we recommend the Board accept the proposed modification provided the technical comments identified in our comments above are addressed.

Attached:

Typical back up generator and storage tank cut sheet.

Please do not hesitate to call Howard Stein Hudson's Chelmsford Office with any questions or concerns.

Sincerely,

Howard Stein Hudson

Patrick Bogle, P.E.
Associate | Civil Engineer

Katie Enright, P.E.
Associate Principal | Senior Civil Engineer

Cat® C4.4 DIESEL GENERATOR SETS

Standby & Prime: 60Hz

Image shown might not reflect actual configuration

Engine Model	Cat® C4.4 In-line 4, 4-cycle diesel
Bore x Stroke	105mm x 127mm (4.1in x 5.0 in)
Displacement	4.4 L (269 in³)
Compression Ratio	16.7:1
Aspiration	Turbocharged
Fuel Injection System	Common Rail

Model	Standby	Prime	Emission Strategy
C4.4	60 ekW	55 ekW	EPA TIER III

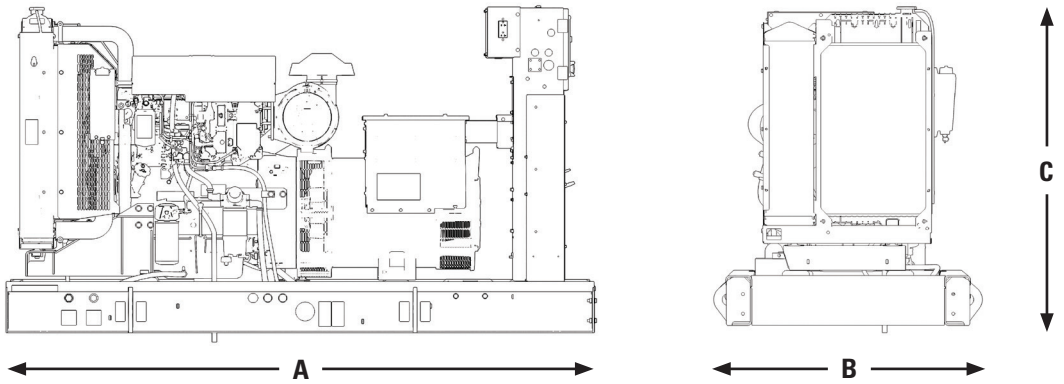
PACKAGE PERFORMANCE

Performance	Standby		Prime	
	3-Phase	1-Phase	3-Phase	1-Phase
Genset Power Rating	75 kVA	60 kVA	67 kVA	55 kVA
Genset power rating with fan @ 0.8 power factor	60 ekW	60 ekW	55 ekW	55 ekW
Performance Number	P4506A	P3468A	P4506P	P4506C
Fuel Consumption				
100% load with fan, L/hr (gal/hr)	16.3 (4.3)	15.9 (4.2)	16.3 (4.3)	14.2 (3.8)
75% load with fan, L/hr (gal/hr)	12.4 (3.3)	12.0 (3.2)	12.4 (3.3)	10.9 (2.9)
50% load with fan, L/hr (gal/hr)	9.0 (2.4)	8.7 (2.3)	9.0 (2.4)	8.0 (2.1)
Cooling System[1]				
Radiator air flow restriction (system), kPa (in. Water)	0.12 (0.48)		0.12 (0.48)	
Engine coolant capacity, L (gal)	7.0 (1.8)	9.5 (2.5)	7.0 (1.8)	9.5 (2.5)
Radiator coolant capacity, L (gal)	9.5 (2.5)	7.0 (1.8)	9.5 (2.5)	7.0 (1.8)
Total coolant capacity, L (gal)	16.5 (4.3)	16.5 (4.3)	16.5 (4.3)	16.5 (4.3)
Inlet Air				
Combustion air inlet flow rate, m³/min (cfm)	6.17 (218)	6.2 (218)	6.02 (212)	6.0 (213)
Max. Allowable Combustion Air Inlet Temp, °C (°F)	45 (113)			
Exhaust System				
Exhaust stack gas temperature, °C (°F)	644 (1191)	644 (1191)	616.0 (1126)	616 (1140)
Exhaust gas flow rate, m³/min (cfm)	14.5 (512)	14.5 (512)	14.0 (491)	13.9 (491)
Exhaust system backpressure (maximum allowable) kPa (in. water)	15.0 (60.2)	15.0 (60.2)	15.0 (60.2)	15.0 (60.2)
Heat Rejection				
Heat rejection to exhaust (total) kW (Btu/min)	66.9 (3805)	66.9 (3805)	62.0 (3526)	62.0 (3526)
Heat rejection to atmosphere from engine, kW (Btu/min)	11.9 (677)	11.9 (677)	11.2 (637)	11.2 (636)

Cat® C4.4 DIESEL GENERATOR SETS

Emissions (Nominal)[2]	Standby			Prime		
NOx + HC, g/kW-hr	4.33			4.33		
CO, g/kW-hr	1.15			1.15		
PM, g/kW-hr	0.18			0.18		
Alternator[3]						
Voltages	208V	480V	240V	208V	480V	240V
Motor starting capability @ 30% Voltage Dip	168 skVA	157 skVA	182 skVA	168 skVA	157 skVA	182 skVA
Frame Size	LC3114D	LC1514P	LCB3114D	LC3114D	LC1514P	LCB3114D
Excitation	Self Excited	Self Excited	Self Excited	Self Excited	Self Excited	Self Excited
Temperature Rise	105°C	130°C	105°C	105°C	125°C	80°C

WEIGHTS & DIMENSIONS



Note: General configuration not to be used for installation. See general dimension drawings for detail.

Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
1932 (76)	**1110 (44)**	**1767 (70)**	**1042 (2298)**

APPLICABLE CODES AND STANDARDS:

AS1359, CSA C22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.
Note: Codes may not be available in all model configurations. Please consult your local Cat Dealer representative for availability.

STANDBY: Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

PRIME: Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated ekW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year

RATINGS: Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

DEFINITIONS AND CONDITIONS

[1] For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

[2] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 BTU/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

[3] UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

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LEHE1564-02 (05/20)

Image shown may not reflect actual configuration

C4.4 LC Integral/Sub-base Fuel Tanks

Newberry
Diesel Generator Set
40-60 kW 60 Hz

Features

- UL Listed for United States (UL 142) and Canada (CAN/ULC S601)
- Facilitate compliance with NFPA 30 code, NFPA 37 and 110 standards and CSA C282 code and B139-09 standard
- Welded, heavy steel gauge construction with a containment basin sized as a minimum 110% of the tank
- Gloss black polyester triglycidyl isocyanurate (TGIC) powder coating
- Dedicated external customer interface area with access to the 4" (101.6 mm) fuel fill, visual level gauge, normal and emergency vents
- Rear electrical stub-up area with removable access panel
- Removable engine supply and return dip tubes
- Two additional 1" (25.4 mm) ports for customer use
- Tanks are rated to safely support the weight of the generator
- Standard NPT tank fittings
- UL listed emergency vents sized as per UL standards 3" (76.2 mm) NPT
- Normal atmospheric vent 1-1/4" (31.75 mm)
- Top-mounted fuel level sensor with control panel alarms
- Top-mounted leak detection switch
- Lockable fuel fill cap, 4" (101.6 mm) NPT

Description

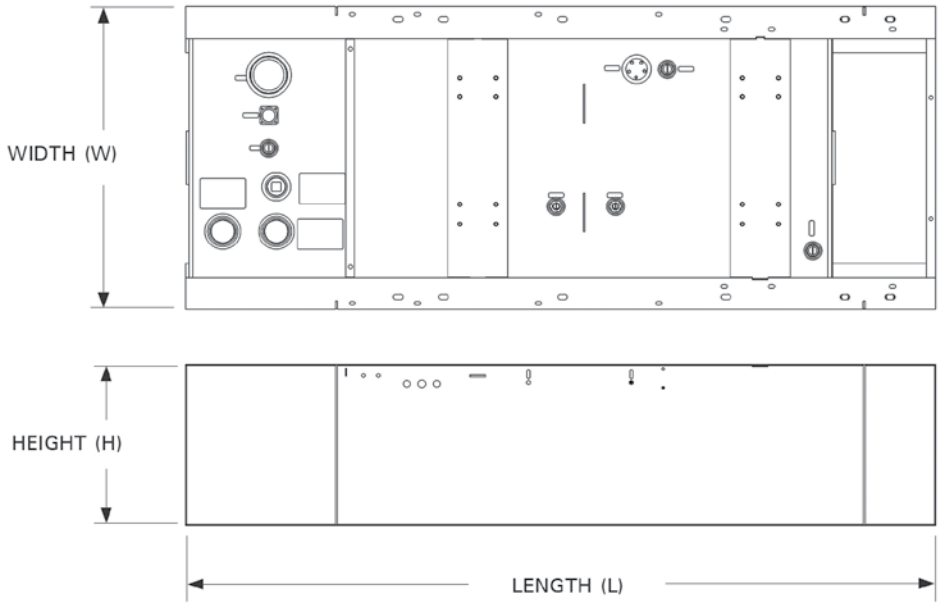
- Dual wall, secondary containment
- Pressure tested to UL requirements
- Fuel tank mounts directly below generator skid base
- Sub-base fuel tank mounts directly below generator skid base
- Integral fuel tank is incorporated into the generator set base frame including linear vibration isolators between tank base, engine, and generator
- Modular tank design is compatible with all factory units open and enclosed

Options

- Emergency vent and normal vent extension kits 12' (3.66 m)
- 5 gal (18.9 L) spill containment
- Overfill prevention valve
- Tank riser to allow for visual secondary containment leak inspection
- Drop tube

C4.4 LC Sub-base Fuel Tank Dimensions and Capacities

Engine Model	Tank Feature Code	Generator Set Rating ekW	Est. Run Time hrs	Fillable Capacity		Usable Capacity		Vent	Length 'L'		Width 'W'		Height 'H'		Weight (Dry)	
				L	gal	L	gal	in	mm	in	mm	in	mm	in	kg	lb
C4.4	INTFT140 SBT140	40	36	520	137	508	134	3	2483	97.8	1000	39.4	533	21.0	336	740
		50	29													
		60	26													
	INTFT250 SBT250	40	68	965	255	952	251	3					864	34.0	466	1027
		50	55													
		60	49													



Note: For reference only – do not use for installation design. Please contact your local dealer for exact dimensions.

Tanks are UL Listed and constructed in accordance with UL Standard for Safety UL 142, Steel Aboveground Tanks for Flammable and Combustible Liquids and Canada CAN/ULC S601, Standard for Shop Fabricated Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids.

Fuel tanks facilitate compliance with the following United States NFPA Code and Standards:
- NFPA 30: Flammable and Combustible Liquids Code
- NFPA 37: Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
- NFPA 110: Standard for Emergency and Standby Power Systems

Fuel tanks facilitate compliance with the following Canadian Standard and Code:
- CSA C282 – Emergency Electrical Power Supply for Buildings
- CSA B139-09 – Installation Code for Oil-Burning Equipment

Picture shown may not reflect actual configuration

Weather Protective and Sound Attenuated Enclosures

D40 to D60
D80 to D100
D125 to D200

Features

Highly Corrosion Resistant construction

- Stainless steel flush fitting latches and hinges tested and proven to withstand extreme conditions of corrosion
- Zinc plated or stainless steel fastener

Excellent Access

- Single side access for service and controls
- All non-service sides have removable doors and/or panels
- Radiator fill access
- Lube oil and coolant drains piped to the exterior of the enclosure base
- Large cable entry area for installation ease
- Double doors on both sides
- Vertically hinged doors with solid bar door stays to hold doors in place when open

Security and Safety

- Lockable access doors which give full access to control panel and breaker
- Cooling fan and battery charging alternator fully guarded
- Fuel fill, oil fill, and battery can only be reached via lockable access
- Stub-up area is rodent proof

Transportability

- These enclosures are of extremely rugged construction to withstand outdoor exposure and rough handling common on many construction sites. The sound deadening material is of a self-extinguishing design
- This range of enclosures are designed on modular principles with many interchangeable components permitting on site repair

Options

- Weather Protective - constructed with 16 gauge steel; industrial silencer mounted within the main enclosure body
- Sound Attenuated Level 1 - constructed with 16 gauge steel; weather protective with critical silencer - silencer mounted in separate upward discharging radiator hood
- Sound Attenuated Level 2 - constructed with 16 gauge steel; weather protective with critical silencer and 100% lined with sound deadening material – silencer mounted in separate upward discharging radiator hood
- Sound Attenuated Aluminum constructed with 14 gauge Aluminum 5052 grade. Weather protective with critical silencer and 100% lined with sound deadening material – silencer mounted in separate upward discharging radiator hood
- Caterpillar Yellow* or white paint
- UL Listed sub base tanks
- Externally mounted emergency stop button
- Seismic certification per applicable building codes: IBC 2000, IBC 2003, IBC 2006, IBC 2009, IBC 2012, CBC 2007, CBC 2010
- IBC certification for 180 mph wind loading

*Not available with Aluminium enclosures

Enclosure Sound Pressure Levels (SPL) at 100%

Weather Protective Enclosure		Cooling Air Flow Rate		SPL @7m (23ft)
Model	Standby eKW	m^3/s	cfm	dBA
D40 (2/4)	40	1.7	3602	85
D50 (2/4)	50	1.7	3602	86
D60 (2/4)	60	1.9	4026	88
D80-8	80	3.2	6696	79
D100-8	100	3.6	7564	81
D125-8	125	4.6	9676	78
D150-10	150	4.6	9676	79
D175-4	175	5.9	12431	84
D200-2	200	5.9	12431	89

SA Level 1 Enclosure		Cooling Air Flow Rate		SPL @7m (23ft)
Model	Standby eKW	m^3/s	cfm	dBA
D40 (2/4)	40	1.7	3602	66
D50 (2/4)	50	1.7	3602	66
D60 (2/4)	60	1.8	3899	71
D80-8	80	3.2	6696	78
D100-8	100	3.2	6696	79
D125-8	125	4.2	8899	74
D150-10	150	4.2	8899	74
D175-4	175	5.6	11830	78
D200-2	200	5.5	11654	81

SA Level 2 Enclosure		Cooling Air Flow Rate		SPL @7m (23ft)
Model	Standby eKW	m^3/s	cfm	dBA
D80-8	80	3.2	6696	75
D100-8	100	3.2	6696	76
D125-8	125	4.2	8899	74
D150-10	150	4.2	8899	74
D175-4	175	5.2	11018	74
D200-2	200	5.1	10806	75

Enclosures

SA Aluminum Enclosure		Cooling Air Flow Rate		SPL @7m (23ft)
Model	Standby eKW	m^3/s	cfm	dBA
D80-8	80	3.2	6696	73
D100-8	100	3.2	6696	74
D125-8	125	4.2	8899	74
D150-10	150	4.2	8899	75
D175-4	175	5.2	11018	75
D200-2	200	5.1	10806	75

The sound pressure level data shown above is quoted as free field and is for guidance only.
Actual levels produced may vary according to site conditions.

Enclosure Dimensions and Weights

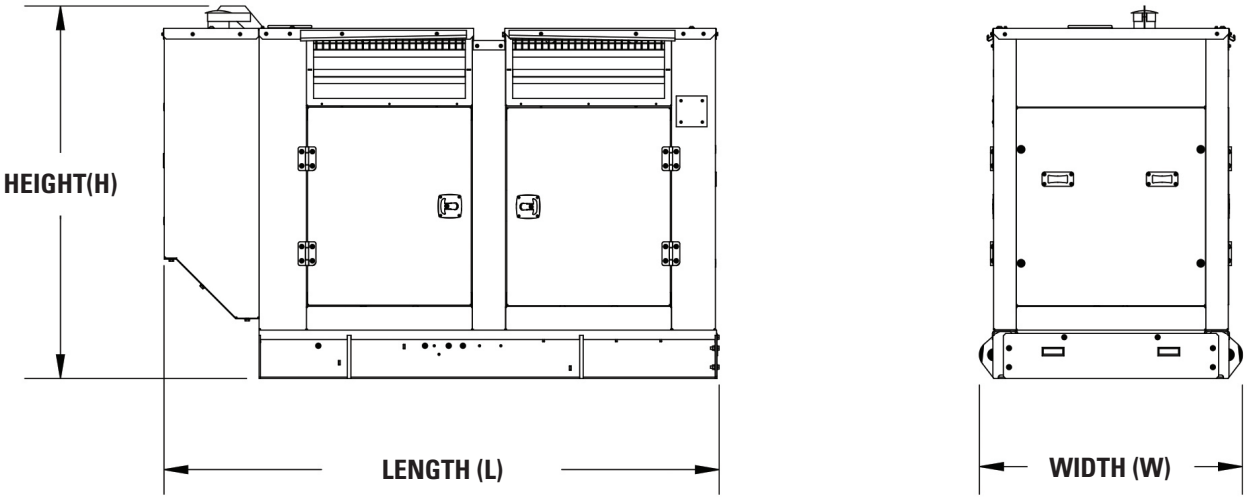


Image represents SA Level 1, SA Level 2 and SA Aluminum enclosures on skid base only

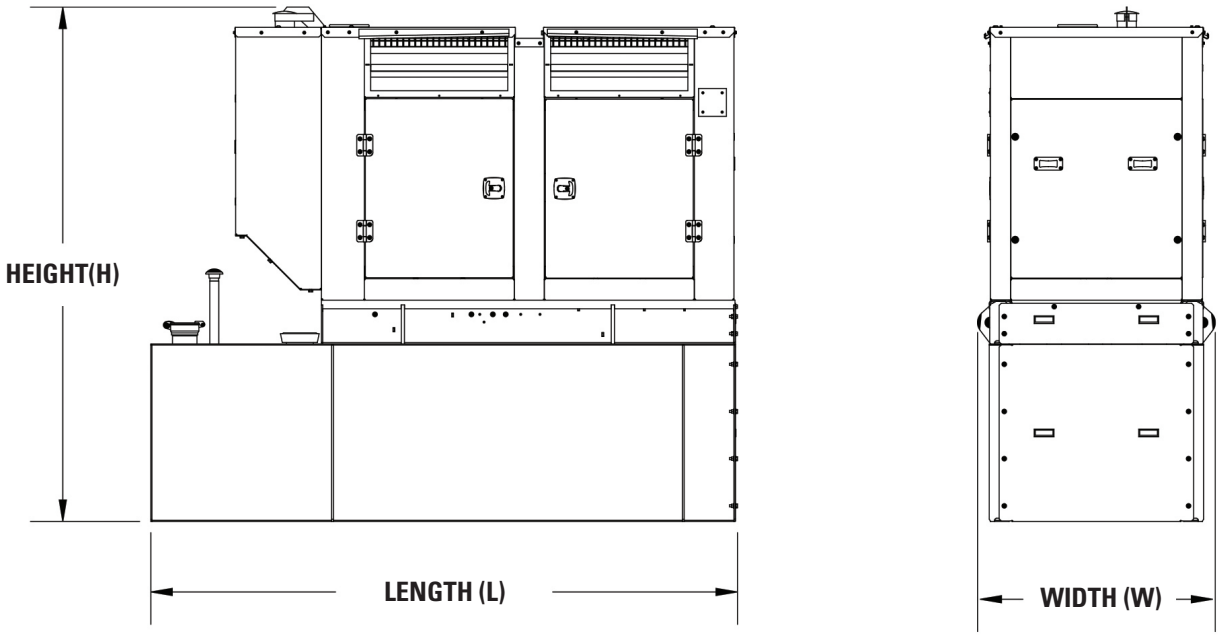


Image represents SA Level 1, SA Level 2 and SA Aluminum enclosures mounted on optional UL listed sub base tank

Model	Standby eKW	WP Industrial		SA Level 1		SA Level 2		SA Aluminum	
		kg	lb	kg	lb	kg	lb	kg	lb
D40-2	40	121	267	137	302	NA	NA	NA	NA
D50-2	50								
D60-2	60								
D80-8	80	263	580	313	690	321	708	142	312
D100-8	100								
D125-8	125	348	768	393	867	406	896	176	387
D150-10	150								
D175-4	175								
D200-2	200								

Enclosure weights (includes muffler)

Enclosure Dimensions Skid Bases

Engine Model	Generator Set Rating ekW	Enclosure	Width 'W'		Length 'L'		Height 'H'	
			mm	in	mm	in	mm	in
C4.4	40	WP	1075	42.3	1972	77.6	1378	54.3
	50							
	60							
	40	SA Level 1, SA Level 2 and SA Aluminum	1075	42.3	1972	77.6	1378	54.3
	50							
	60							
C4.4	80	WP	1110	43.7	2523	99.3	1773	69.8
	100							
	80	SA Level 1, SA Level 2 and SA Aluminum	1110	43.7	2891	113.8	1852	72.9
	100							
C7.1	125	WP	1110	43.7	3204	126.1	1773	69.8
	150							
	175							
	200							
	125	SA Level 1, SA Level 2 and SA Aluminum	1110	43.7	3659	144.1	1852	72.9
	150							
	175							
	200							

Enclosure Dimensions on UL Listed Sub Base Tanks

Engine Model	Generator Set Rating ekW	Enclosure	137 Gallon Sub Base Tank				255 Gallon Sub Base Tank			
			Length 'L'		Height 'H'		Length 'L'		Height 'H'	
			mm	in	mm	in	mm	in	mm	in
C4.4	40	WP	2503	98.5	1912	75.3	2503	98.5	2241	88.2
	50									
	60									
	40	SA Level 1, SA Level 2 and SA Aluminum	2503	98.5	1912	75.3	2503	98.5	2241	88.2
	50									
	60									

Engine Model	Generator Set Rating ekW	Enclosure	209 Gallon Sub Base Tank				394 Gallon Sub Base Tank			
			Length 'L'		Height 'H'		Length 'L'		Height 'H'	
			mm	in	mm	in	mm	in	mm	in
C4.4	80	WP	3447	135.7	2258	88.9	3447	135.7	2608	102.7
	100									
	80	SA Level 1, SA Level 2 and SA Aluminum	3447	135.7	2337	92.0	3447	135.7	2687	105.8
	100									

Engine Model	Generator Set Rating ekW	Enclosure	402 Gallon Sub Base Tank				777 Gallon Sub Base Tank			
			Length 'L'		Height 'H'		Length 'L'		Height 'H'	
			mm	in	mm	in	mm	in	mm	in
C7.1	125	WP	4035	158.9	2420	95.3	5035	198.2	2706	106.5
	150									
	175									
	200									
	125	SA Level 1, SA Level 2 and SA Aluminum	4035	158.9	2499	98.4	5035	198.2	2785	106.5
	150									
	175									
	200									

Note: Weight includes oil and coolant but not fuel
Ref: WPIA, WPIB, WPIC, SATCBA, SATCBB, SAT, CBC, SATFBA, SATFBB, SATFBC, ENCAL02, ENCAL03, ENCAL04.

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LEHE0417-11 (06/20)

PACKAGE DATA [NAC224P]

SEPTEMBER 21, 2020

For Help Desk Phone Numbers Click here

Feature Code:	NAC224P	**Rating Type:**	STANDBY	**Sales model Package:**	D60-4LC
Engine Sales Model:	C4.4	**Engine Arrangement Number:**	4859941	**Hertz:**	60
EKW W/F:	60.0	**Noise Reduction:**	0 dBA	**Back Pressure:**	0.0 inH2O

Engine Package Information

Engine Package Data

Package Cooling Information

Open Cooling Data

% Load	Airflow Rate scfm			Ambient Capability Sea Level (Deg F)			Ambient Capability 300 m (Deg F)			Ambient Capability 600 m (Deg F)			Ambient Capability 900 m (Deg F)		
	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O	0 inH2O	1/2 inH2O	3/4 inH2O
100.0	4414	3778	3460	141	136	120	138	132	116	134	129	113	131	125	109
75.0	4414	3778	3460	154	149	131	150	145	127	147	141	123	143	138	120
50.0	4414	3778	3460	165	159	143	161	156	140	158	152	136	154	149	132
25.0	4414	3778	3460	177	172	156	174	168	152	170	165	149	167	161	145

SA Level 1 Canopy Cooling Data

% Load	Airflow Rate scfm	Ambient Capability Sea Level (Deg F)	Ambient Capability 300 m (Deg F)	Ambient Capability 600 m (Deg F)	Ambient Capability 900 m (Deg F)
100.0	4025	136	132	129	125
75.0	4025	147	143	140	136
50.0	4025	159	156	152	149
25.0	4025	170	167	163	159

WP Canopy - Industrial Cooling Data

% Load	Airflow Rate scfm	Ambient Capability Sea Level (Deg F)	Ambient Capability 300 m (Deg F)	Ambient Capability 600 m (Deg F)	Ambient Capability 900 m (Deg F)
100.0	4025	136	132	129	125
75.0	4025	150	147	143	140
50.0	4025	163	159	156	152
25.0	4025	176	172	168	165

Package Sound Information

Sound Comments : Open Exhaust Data @ 0.5m

SA Level 1 Canopy Sound Data

Distance: 3.3 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	86.9	92.8	84.9	84.0	81.3	82.5	79.3	75.5	78.0
45.0	75.0	85.6	90.8	83.6	83.6	80.5	81.7	77.5	74.0	73.4
30.0	50.0	84.6	88.7	82.3	83.2	79.8	81.0	76.1	72.8	69.9
15.0	25.0	83.9	86.3	81.0	82.7	79.3	80.4	75.3	72.0	67.5

Distance: 23.0 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	74.1	85.7	77.7	78.2	68.6	68.5	66.5	63.1	64.3
45.0	75.0	72.3	83.7	76.8	78.0	67.4	66.8	64.0	60.7	59.3
30.0	50.0	71.0	81.3	75.7	76.6	66.4	65.5	62.2	59.0	55.5
15.0	25.0	70.1	78.5	74.3	74.2	65.6	64.7	61.1	57.9	53.2

Distance: 49.2 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	68.1	79.7	71.7	72.2	62.6	62.5	60.5	57.1	58.3
45.0	75.0	66.3	77.7	70.8	72.0	61.4	60.8	58.0	54.7	53.3
30.0	50.0	65.0	75.3	69.7	70.6	60.4	59.5	56.2	53.0	49.5
15.0	25.0	64.1	72.5	68.3	68.2	59.6	58.7	55.1	51.9	47.2

WP Canopy - Industrial Sound Data

Distance: 3.3 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	99.1	98.4	96.4	95.1	92.5	94.9	92.2	89.8	86.5
45.0	75.0	97.7	97.2	94.8	96.3	91.5	93.3	90.6	87.7	84.0
30.0	50.0	95.3	95.2	92.1	95.2	89.8	90.9	87.9	84.7	81.1
15.0	25.0	92.0	92.4	88.4	91.6	87.3	87.6	84.2	80.7	78.0

Distance: 23.0 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	87.5	93.0	86.6	87.1	79.2	82.3	82.0	78.3	75.1
45.0	75.0	86.1	91.8	85.2	84.0	78.2	81.1	80.3	76.2	72.6
30.0	50.0	83.6	89.5	82.6	80.6	76.5	78.7	77.5	73.2	69.7
15.0	25.0	80.1	86.3	78.9	77.0	74.0	75.3	73.4	69.1	66.5

Distance: 49.2 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	81.5	87.0	80.6	81.1	73.2	76.3	76.0	72.3	69.1
45.0	75.0	80.1	85.8	79.2	78.0	72.2	75.1	74.3	70.2	66.6
30.0	50.0	77.6	83.5	76.6	74.6	70.5	72.7	71.5	67.2	63.7
15.0	25.0	74.1	80.3	72.9	71.0	68.0	69.3	67.4	63.1	60.5

Open Exhaust Sound Data

Distance: 3.3 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	111.0	111.0	116.0	111.0	106.0	107.0	101.0	96.0	83.0
45.0	75.0	109.0	110.0	113.0	111.0	104.0	106.0	100.0	93.0	80.0
30.0	50.0	106.0	110.0	109.0	109.0	101.0	103.0	97.0	88.0	75.0
15.0	25.0	102.0	108.0	103.0	101.0	98.0	99.0	92.0	82.0	70.0

Open Mechanical Sound Data

Distance: 3.3 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	93.3	85.9	85.5	86.2	87.0	86.3	88.7	84.5	77.8
45.0	75.0	92.7	85.0	86.4	87.0	87.1	86.3	88.1	82.4	76.0
30.0	50.0	91.7	84.2	86.3	87.1	86.5	86.1	86.7	80.5	74.5
15.0	25.0	90.4	83.6	85.1	86.5	85.4	85.5	84.6	78.9	73.1

Distance: 23.0 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	83.3	75.9	75.5	76.2	77.0	76.3	78.7	74.5	67.8
45.0	75.0	82.7	75.0	76.4	77.0	77.1	76.3	78.1	72.4	66.0
30.0	50.0	81.7	74.2	76.3	77.1	76.5	76.1	76.7	70.5	64.5
15.0	25.0	80.4	73.6	75.1	76.5	75.4	75.5	74.6	68.9	63.1

Distance: 49.2 Feet

EKW W/F	% LOAD	OVERALL SOUND DB(A)	OBCF 63HZ DB	OBCF 125HZ DB	OBCF 250HZ DB	OBCF 500HZ DB	OBCF 1000HZ DB	OBCF 2000HZ DB	OBCF 4000HZ DB	OBCF 8000HZ DB
60.0	100.0	77.3	69.9	69.5	70.2	71.0	70.3	72.7	68.5	61.8
45.0	75.0	76.7	69.0	70.4	71.0	71.1	70.3	72.1	66.4	60.0
30.0	50.0	75.7	68.2	70.3	71.1	70.5	70.1	70.7	64.5	58.5
15.0	25.0	74.4	67.6	69.1	70.5	69.4	69.5	68.6	62.9	57.1

SYSTEMS DATA [NAC224P]

SEPTEMBER 21, 2020

For Help Desk Phone Numbers Click here

Reference Number: P4506A **Version Symbol:** **Change Level:**

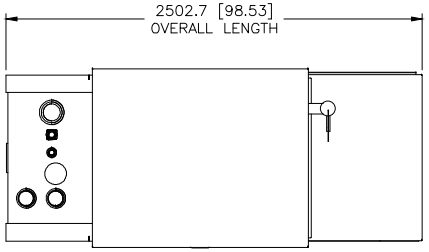
Sales Model: C4.4 DI T **Eff. Serial Number Prefix:** **Engr. Model:**

Description	Answer	Unit
Air Intake System		
The installed system must comply with the system limits below for all emissions certified engines to assure regulatory compliance.		
MAX ALLOW INTAKE RESTR W/CLEAN ELEMENT	12.1	IN WTR
MAX ALLOW INTAKE RESTR W/DIRTY ELEMENT	20.1	IN WTR
ALLOW PRESS DROP-COMPR OUT TO MANF IN	3.0	IN HG
MAX TURBO INLET AIR TEMPERATURE	77	DEG F
Cooling System		
ENGINE ONLY COOLANT CAPACITY	0.0	GAL
REGULATOR START-TO-OPEN TEMP	180	DEG F
REGULATOR FULL OPENING TEMPERATURE	207	DEG F
Engine Spec System		
CYLINDER ARRANGEMENT		
NUMBER OF CYLINDERS	4	CYL
CYLINDER BORE DIAMETER	4.1339	IN
PISTON STROKE	5.0000	IN
TOTAL CYLINDER DISPLACEMENT	269	CU IN
COMPRESSION RATIO (TO ONE)	16.7	
CRANKSHAFT ROTATION (FROM FLYWHEEL END)	CCW	
CYLINDER FIRING ORDER		
STROKES/COMBUSTION CYCLE	4	STROKES
Exhaust System		
The installed system must comply with the system limits below for all emissions certified engines to assure regulatory compliance.		
Fuel System		
MAX ALLOW FUEL SUPPLY LINE RESTRICTION	11.8	IN HG
MAX ALLOW FUEL RETURN LINE RESTR	14.8	IN HG
FUEL SYSTEM TYPE		
Lube System		
MAXIMUM ALLOWABLE OIL TEMP	257	DEG F
MIN LI OP W/SAE 10W30 OIL @ 99 DEG C	0.0	PSI
Mounting System		
ENG WET WT W/OIL AND WATER W/O FUEL	988	LB
DRY WT ENG ONLY (DRAINED OF FLUIDS)	968	LB
ENGINE LENGTH	50.3936	IN
ENGINE HEIGHT	38.0708	IN
ENGINE WIDTH	28.2283	IN
Starting System		

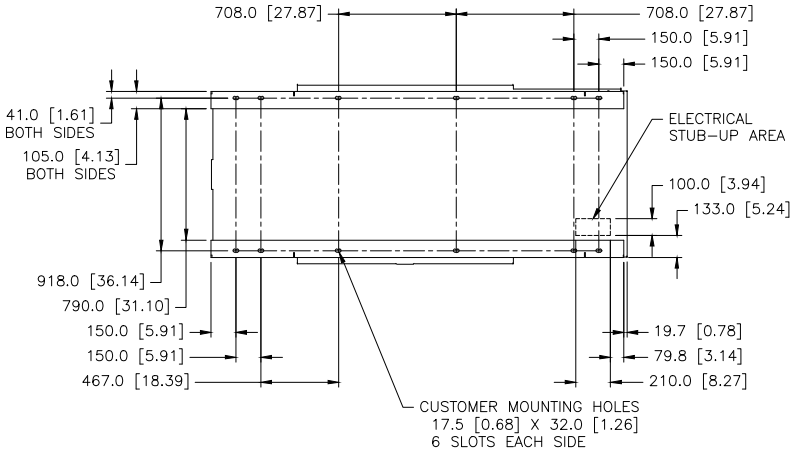
METRIC 528-6779

QTY	ENGINE CONNECTIONS	SIZE	SHEET
1	COOLANT DRAIN	1/4-18 THD	2
1	EXHAUST	ø63.3 [ø2.49]	2
1	OIL DRAIN	1/4-18 THD	2

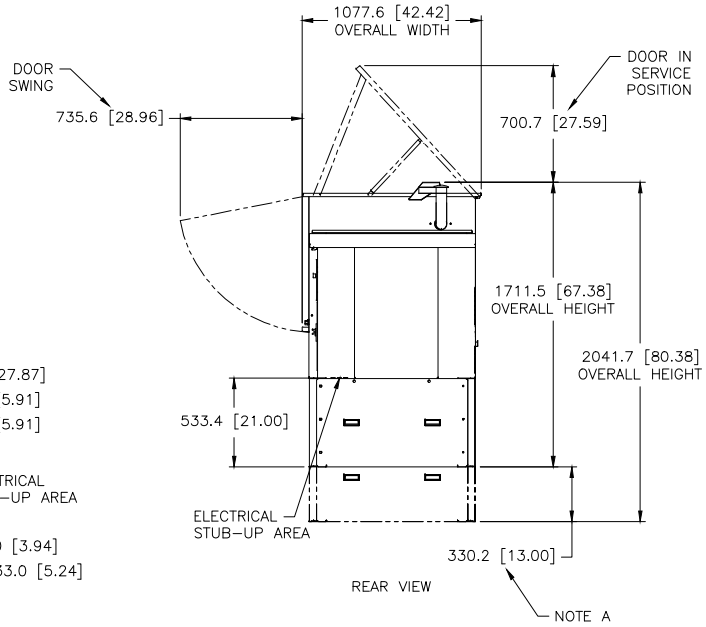
QTY	POSSIBLE TANK CONNECTIONS	SIZE	SHEET
1	BASIN TANK EMERGENCY VENT	3" NPT THD	3
1	FUEL FILLER	4" NPT THD	3
1	MAIN TANK EMERGENCY VENT	3" NPT THD	3
1	NORMAL VENT	2" NPT THD	3
1	RUPTURE BASIN ALARM	1" NPTF THD	3
2	SPARE PORT	1" NPTF THD	3



TOP VIEW



FOOTPRINT
(DIMENSIONED OUTLINE VIEW FROM ABOVE)



REAR VIEW

MODEL	TYPE	PRICING AR	ENCLOSURES	TANK GROUP	TANK CAPACITY
C4.4	Y	LS-2635 CHG 02	LS-2425 CHG 02	LS-2410 CHG 02	137 US GAL
		LS-2636 CHG 02	LS-2426 CHG 02		
		LS-3096 CHG 01	LS-2433 CHG 01	LS-2411 CHG 03	255 US GAL
		LS-3097 CHG 01	LS-2434 CHG 01		
		LS-3098 CHG 01			
		LS-3099 CHG 01			

NOTE A: DIM FROM THE BOTTOM OF THE 137 US GAL TANK TO THE BOTTOM OF THE 255 US GAL TANK

1E2966 IDENT
1E2733 DRAWING-AUTOCAD
1E0138 BRAND MARKINGS
1E0013 CONFIDENTIALITY
1E0012 INTERPRETATION
1E0011 INTPR & TOL

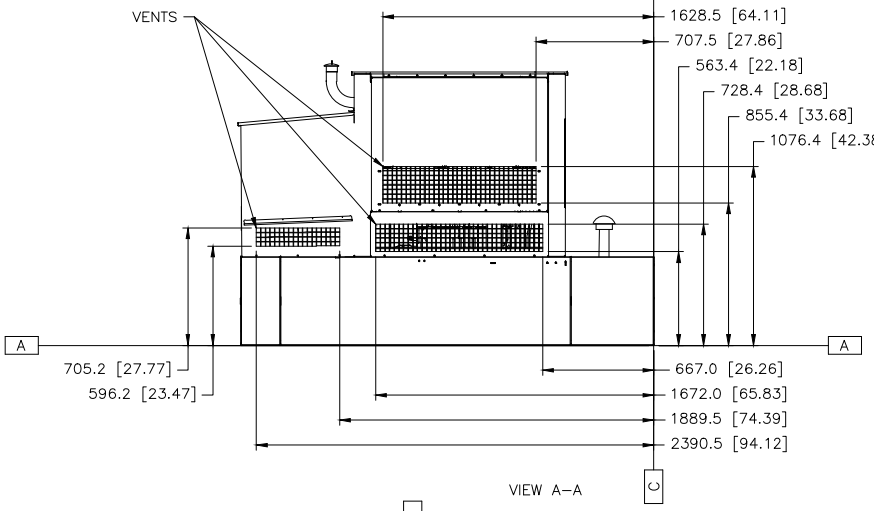
SPEC NO.	NAME
DFTR	J.O. SCHAIDLE
CHK	M.J. SWIFT
APPD	N.P. MOUNTJOY
DES	
OTHER	RECORDS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MM [INCH]
DIMENSIONS W/O TOL ARE BASIC
SCALE 1 = 10
SHEET 1 OF 3
THIRD ANGLE PROJECTION
CHG 01 29JUN18
DATE

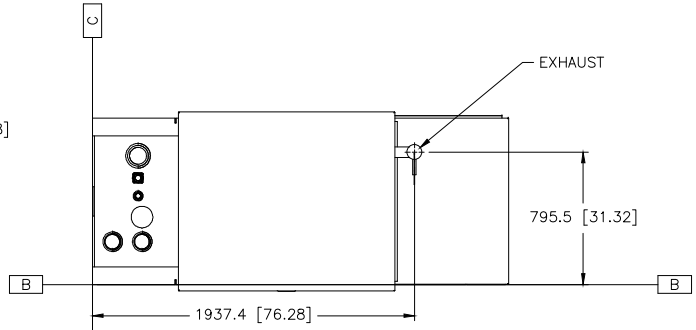
CATERPILLAR INC.

INSTALLATION-COMPOSITE
C4.4 ENCL W/ INTEGRAL TANK
528-6779
SIZE E
W598

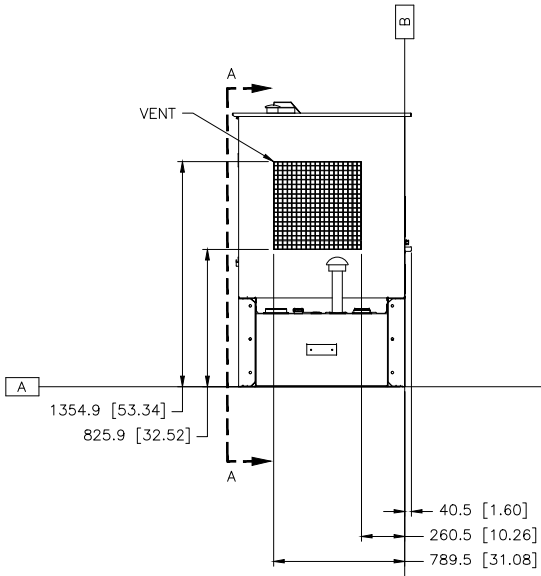
METRIC 528-6779



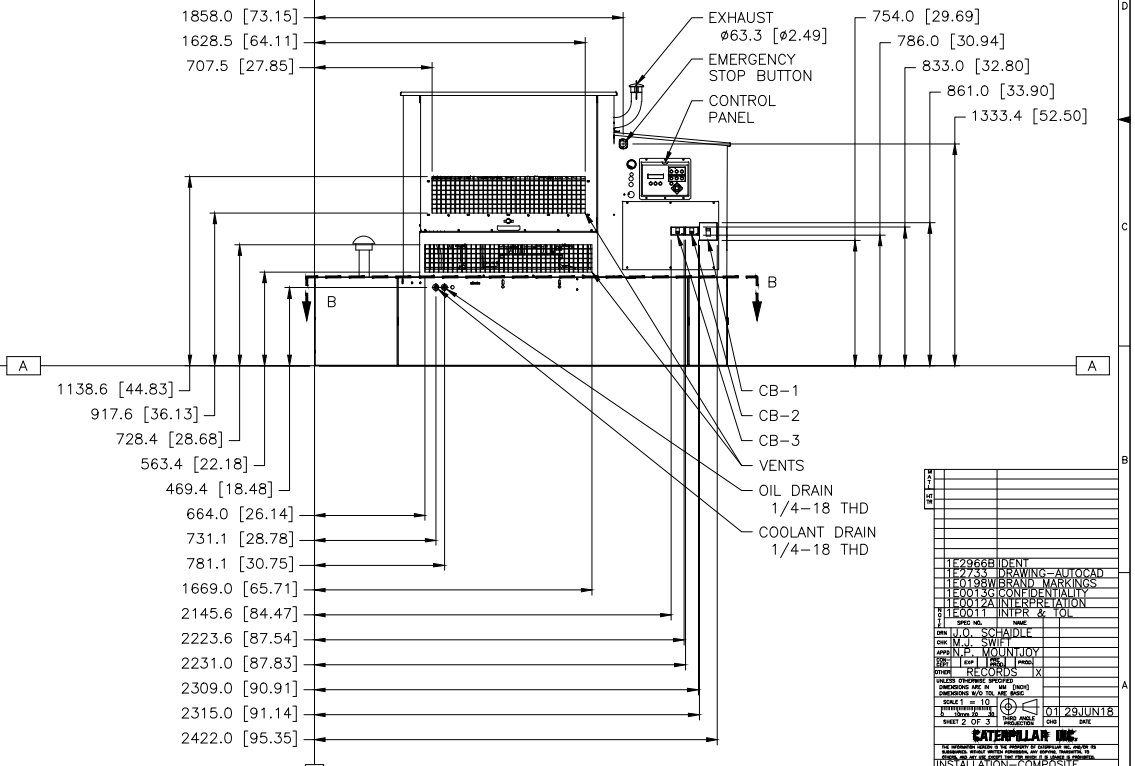
VIEW A–A



TOP VIEW



FRONT VIEW



LEFT SIDE VIEW

1E2966 IDENT
1E2733 DRAWING-AUTOCAD
1E0138 BRAND MARKINGS
1E0013 CONFIDENTIALITY
1E0012 INTERPRETATION
1E0011 INTPR & TOL

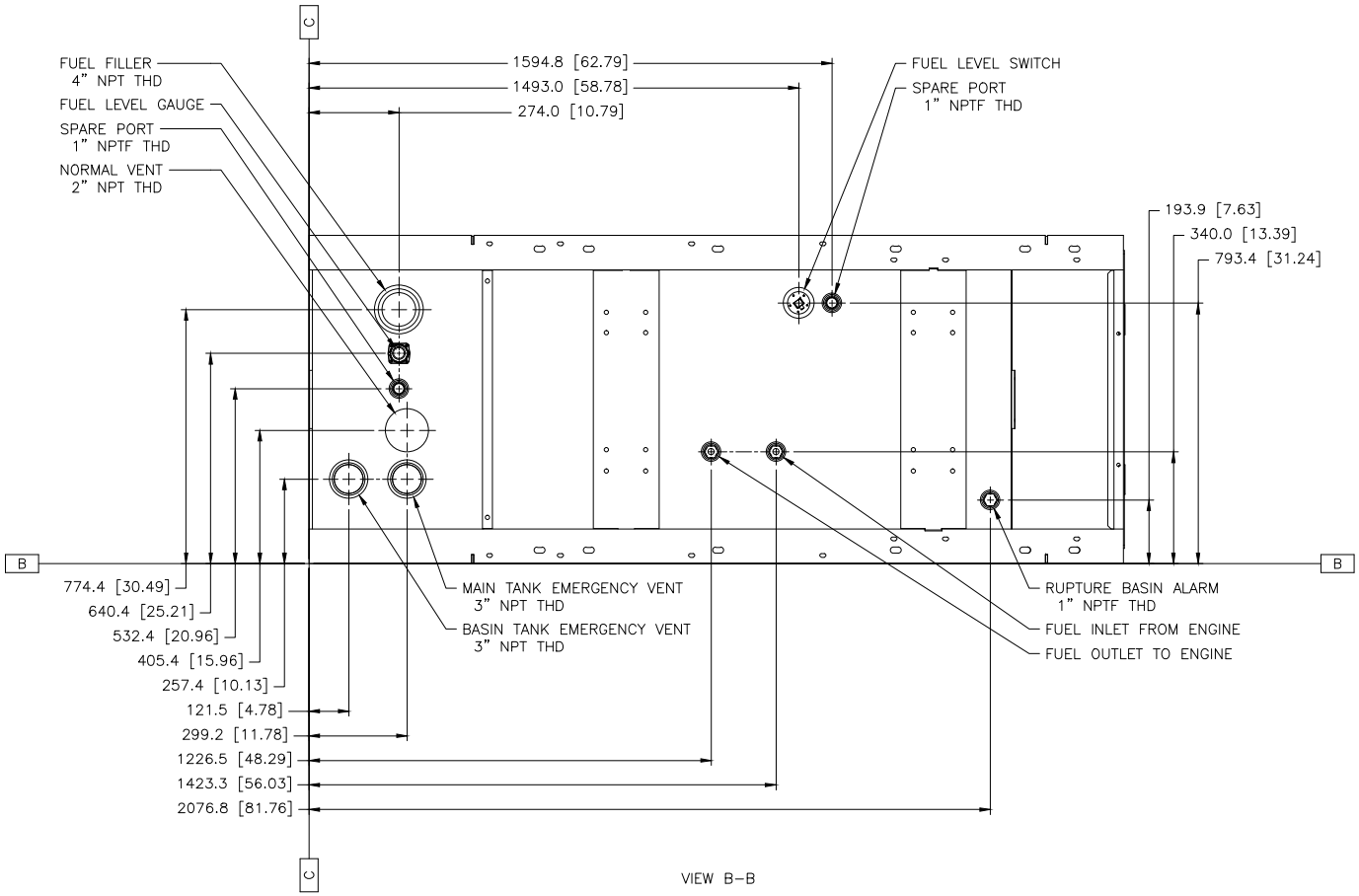
	SPEC NO.	NAME
DFTR		J.D. SCHAIDLE
CHK		M.J. SWIFT
APPD		N.P. MOUNTJOY
ENG APPD		
OTHER	RECORDS	X

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN mm [INCH]
DIMENSIONS W/O TOL ARE BASIC
SCALE 1 = 10
SHEET 2 OF 3
THIRD ANGLE PROJECTION
01 29JUN18

CATERPILLAR INC.

INSTALLATION-COMPOSITE
C4.4 ENCL W/ INTEGRAL TANK
528-6779 - DRG W598 E

METRIC 528-6779



VIEW B-B

1E2966	IDENT
1E2733	DRAWING-AUTOCAD
1E0138	BRAND MARKINGS
1E0013	CONFIDENTIALITY
1E0012	INTERPRETATION
1E0011	INTPR & TOL

DRN J.D. SCHAIDLE
CHK M.J. SWIFT
APPD N.P. MOUNTJOY
DIMENSIONS ARE IN MM [INCH]
DIMENSIONS W/O TOL ARE BASIC
SCALE 1 = 5
SHEET 3 OF 3
THIRD ANGLE PROJECTION
01 29JUN18
CHG DATE

CATERPILLAR INC.

INSTALLATION-COMPOSITE
C4.4 ENCL W/ INTEGRAL TANK
528-6779 - DRG W598 E