



## City of Ann Arbor

PLANNING & DEVELOPMENT SERVICES — PLANNING DIVISION

301 East Huron Street | P.O. Box 8647 | Ann Arbor, Michigan 48107-8647

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### BUILDING BOARD OF APPEALS SPECIAL MEETING MAY 6, 2016 NOTICE OF CONTINUATION OF HEARING

APRIL 27, 2016

**BY CERTIFIED MAIL, FIRST CLASS MAIL & POSTING**

American Honda Corporation  
3947 Research Park Dr  
Ann Arbor, MI 48108

RE: 3947 Research Park Dr, Ann Arbor, Michigan 48108  
Parcel Identification Number ("PIN"): 09-12-09-302-006

Dear American Honda Representatives:

This letter is to inform you of a Notice of Continuation Hearing of the Ann Arbor Building Board of Appeals. The meeting will take place on **May 6, 2016 at 1:30 p.m.** in the 2<sup>nd</sup> flr Council Chambers of Ann Arbor City Hall. At the hearing you will have the opportunity to present your evidence and testimony for an appeal to the Building Board of Appeals.

**This meeting is a continuation of the Special Appeal Meeting from February 24, 2016.**

The Ann Arbor City Hall is located at 301 East Huron, Ann Arbor, Michigan.

If you have any questions please contact me by email.

Sincerely,

Craig Strong, Building Official  
City of Ann Arbor Construction Services  
[cstrong@a2gov.org](mailto:cstrong@a2gov.org)



**CITY OF ANN ARBOR, MICHIGAN**  
Community Services Area  
Planning & Development Services Unit  
301 E. Huron St, P.O. Box 8647, Ann Arbor, Michigan 48107-8647  
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## **BBA STAFF REPORT**

April 27, 2016

Building Board of Appeals  
City of Ann Arbor

Re: Continuation of Honda Appeal with Regard to Elimination of Electrical Power upon Alarm in the Test Cell Pit.

Applicant: American Honda  
3947 Research Park Dr.  
Ann Arbor, MI

Dear Board Members:

In an effort to clarify my position to require Honda to remove all electrical power from the test cell pit in the event of an alarm I offer the following summation:

After carefully review of the information I would like to respond as a Building Official who has the enormous responsibility of code interpretations as it relates to life safety issues. From the beginning I have reviewed and rejected Honda's intentions to classify this emissions testing facility use as a Minor Repair Garage as defined in NFPA 30:

### **MINOR REPAIR GARAGE DEFINED**

*A building or portions of a building used for the lubrication, inspection, and minor automotive maintenance work, such as engine tune ups, replacement of parts, fluid changes (e.g. oil, antifreeze, transmission fluid, brake fluid, air conditioning refrigerants, et.) brake system repairs, tire rotation, and similar routine maintenance work, including associated floor space used for offices, parking, or showrooms.*

In Honda's case, it is my understanding that the testing procedure involves placing a new or used vehicle on a chassis dynamometer, located within an enclosed climate controlled test cell with a pit located below it containing general purpose (non-explosion proof) rated electrical panels and components capable of distributing 4000 volts of electricity upon demand. Once the test commences the dynamometer applies resistance to the vehicle to simulate normal and adverse road conditions.

Based on this, I cannot apply the definition of a Minor Repair Garage to this use. Nothing in this definition relates to this proposed application and anytime a gasoline engine vehicle is subject to a test condition of this type it is my opinion that it has the possibility of a fuel leak into the pit below and the Performance Based Code provisions of the 2009 IFC considers that when evaluating non-prescriptive hazards. Unfortunately for us Code Officials, the Codes have not evolved at the same speed as technology when evaluating these testing facilities and therefore I

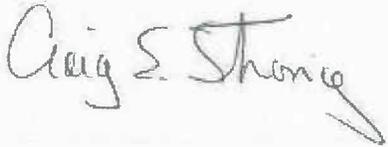
must interpret them using a common sense, or performance based approach where there is a non-specific prescriptive use.

Section 2701.3.3.5 of the 2009 IFC requires that safeguards shall be provided to minimize the risk of exposing combustible hazardous materials to unintended sources of ignition.

Based on this, it is my interpretation that placing 4000 volts of unprotected electricity in a pit that could provide an ignition source for explosive liquid or vapor is an ignition hazard. The commentary explains that *the primary design and operating intent is to ensure that flammable and combustible materials are always completely controlled in accordance with process design parameters. Such controls may involve the following: Electrical classification of areas where flammable hazardous materials might be present.*

Based on the fact that this electrical equipment in the pit is general purpose and not explosion proof, the removal of power to the pit upon alarm is requirement of the Code.

Thank you,

A handwritten signature in black ink that reads "Craig E. Strong". The signature is written in a cursive, slightly slanted style.

Craig E. Strong, Building Official  
City of Ann Arbor

# DRIGGERS, SCHULTZ & HERBST

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April 19, 2016

City of Ann Arbor Planning & Development Services Unit  
301 East Huron Street  
P.O. Box 8647  
Ann Arbor, Michigan 48107

**Re: 3947 Research Park Drive, Ann Arbor, Michigan 48108**  
**Property Owner: American Honda Motor Company, Inc.**  
**Re: Appeal of Decisions of Building Official Regarding Requirements**  
**Related to the Storage and Use of Hazardous Materials, and**  
**Application for Exception**  
**Ann Arbor BBA Appeal No. 16-0259**

Dear Sir/Madam:

Enclosed are the following:

1. April 19, 2016 letter to Kristen D. Larcom, Senior Assistant City Attorney, regarding the Building Board of Appeals' authority to grant a variance in Honda's appeal.
2. Photographs which were shown to the Building Board of Appeals members during the February 24, 2016 hearing.
3. April 8, 2016 letter from Daniel Parker, P.E. to Mr. Craig Strong regarding additional supporting documentation for the Honda test cell classification. This letter was presented to Mr. Strong on April 18, 2016.

We request that these items be filed so that they are part of the record in this appeal. We also request that you return copies of these documents to us with proof that they have been filed in the enclosed self-addressed, stamped envelope. Please forward these documents to the BBA members for their consideration.

City of Ann Arbor Planning & Development Services Unit  
April 19, 2016  
Page 2

Please do not hesitate to contact me if you have any questions.

Very truly yours,

DRIGGERS, SCHULTZ & HERBST, P.C.



William C. Schaefer

WCS/ch  
Enclosures

cc: Kristen D. Larcom, Senior Assistant City Attorney

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April 19, 2016

VIA EMAIL TO [KLARCOM@A2GOV.ORG](mailto:KLARCOM@A2GOV.ORG)

Kristen D. Larcom, Esq.  
Senior Assistant City Attorney  
City of Ann Arbor  
301 East Huron Street  
Ann Arbor, Michigan 48107

Re: 3947 Research Park Drive, Ann Arbor, Michigan 48108  
Property Owner: American Honda Motor Company, Inc.  
Ann Arbor BBA Appeal No. 16-0259

Dear Ms. Larcom:

This letter follows up on our conference at the April 1, 2016 meeting with you, Mr. Delacourt, Mr. Strong, and others.

In its appeal to the Ann Arbor Building Board of Appeals (the "BBA"), Honda is appealing the Building Official's decisions because the intent of the code has been wrongly interpreted and certain provisions of the code do not apply. In the alternative, Honda is seeking variances from the Building Official's decisions.

Michigan Compiled Laws ("MCL") 125.1501 et seq. is the Stille-DeRossett-Hale Single State Construction Code Act. MCL 125.1515 provides that a municipality's building board of appeals "*may grant a specific variance* to a substantive requirement of the code if the literal application of the substantive requirement will result in exceptional, practical difficulty to the applicant," and if (a) performance of the particular item or part of the building or structure with respect to which the variance is granted shall be adequate for its intended use and shall not substantially deviate from performance required by the code; and (b) the specific condition justifying the variance shall be neither so general nor recurrent in nature as to make an amendment of the code reasonably practical or desirable.

Kristen D. Larcom, Esq.  
April 19, 2016  
Page 2

In addition, MCL 125.1516(1) references that an applicant may appeal the denial of a request for a variance by a board of appeals to the state construction code commission.

We enclose copies of MCL 125.1515 and 125.1516 for your review.

Further, we note that the Building Official cited Section 103.1 of the building code entitled "Means of Appeal" in the City's February 22, 2016 response to Honda's appeal. That section provides that an applicant's appeal may be granted on the ground that "an equal or better form of construction is proposed."

Honda requests that the BBA consider granting Honda variances pursuant to either MCL 125.1515 or Section 113.1 of the building code.

We are sending a copy of this letter to the City to become part of the record of the appeal and request that it be presented to the members of the BBA for their consideration.

Please do not hesitate to contact me if you have any questions.

Very truly yours,

DRIGGERS, SCHULTZ & HERBST, P.C.



William C. Schaefer 7

WCS\ch  
Enclosures

cc: Building Board of Appeals, City of Ann Arbor  
c/o City of Ann Arbor Planning & Development Services Unit

**STILLE-DEROSSETT-HALE SINGLE STATE CONSTRUCTION CODE ACT (EXCERPT)**  
**Act 230 of 1972**

**125.1515 Specific variance from code; requirements; breach of condition; permissible variance.**

Sec. 15. (1) After a public hearing a board of appeals may grant a specific variance to a substantive requirement of the code if the literal application of the substantive requirement would result in an exceptional, practical difficulty to the applicant, and if both of the following requirements are satisfied:

(a) The performance of the particular item or part of the building or structure with respect to which the variance is granted shall be adequate for its intended use and shall not substantially deviate from performance required by the code of that particular item or part for the health, safety and welfare of the people of this state.

(b) The specific condition justifying the variance shall be neither so general nor recurrent in nature as to make an amendment of the code with respect to the condition reasonably practical or desirable.

(2) A board of appeals may attach in writing any condition in connection with the granting of a variance that in its judgment is necessary to protect the health, safety and welfare of the people of this state. The breach of a condition shall automatically invalidate the variance and any permit, license and certificate granted on the basis of it. In no case shall more than minimum variance from the code be granted than is necessary to alleviate the exceptional, practical difficulty.

**History:** 1972, Act 230, Eff. Jan. 1, 1973.

**Popular name:** Act 230

**Popular name:** Uniform Construction Code

**STILLE-DEROSSETT-HALE SINGLE STATE CONSTRUCTION CODE ACT (EXCERPT)**  
**Act 230 of 1972**

**125.1516 Appeal to commission; time; hearing; quorum; effect of decision; copy of decision and statement of reasons; record of decisions; public inspection; referral of certain appeals to appropriate board; review of board's decision; petition.**

Sec. 16. (1) An interested person, or the interested person's authorized agent, may appeal a decision of a board of appeals to the commission within 10 business days after filing of the decision with the enforcing agency or, in case of an appeal because of failure of a board of appeals to act within the prescribed time, at any time before filing of the decision. The hearing of an appeal based on the denial of a request for a variance by a board of appeals is within the sole discretion of the commission. If deciding an appeal, the commission may act either as a whole or by a panel of 3 or more of the commission members designated by the commission's chairperson to hear and decide the appeal. A majority of a panel constitutes a quorum and a decision by a panel requires concurrence of at least a majority of the panel's members. If an appeal has been presented to the commission within the time prescribed, the appeal shall be heard de novo by the commission. The commission may affirm, modify, or reverse a decision of the board of appeals or the enforcing agency. Except if modified or reversed by a court of competent jurisdiction, a decision of the commission made under this section is binding on the applicant and the affected board of appeals and enforcing agency. An appeal to the commission shall be decided within 30 days after receipt of the appeal by the commission. A copy of the decision and a statement of reasons for the decision shall be sent to the applicant and filed with the affected board of appeals and enforcing agency within 5 business days after the making of the decision. A record of decisions made by the commission under this section, properly indexed, shall be kept in the office of the commission, and be open to public inspection during business hours in compliance with the freedom of information act, 1976 PA 442, MCL 15.231 to 15.246.

(2) Notwithstanding subsection (1), the executive director of the commission shall refer an appeal to the commission under subsection (1) which in the executive director's judgment relates principally to a mechanical, plumbing, electrical, or barrier free design matter to the appropriate board. The board shall hear and decide the appeal in the same manner as an appeal is heard and decided by the commission under this section, except that a board shall meet as a whole and not in a panel. A person aggrieved by a decision of a board on any appeal under this subsection may petition the commission to review the decision. The commission shall act on the petition within 5 business days after receipt, and may grant the petition at the commission's discretion except that the commission shall grant the petition if it appears that the appeal involves a question of major significance to the people of this state and that the case of the appellant has substantial merit. If the commission grants the petition, the commission acting as a whole shall review the decision in accordance with a procedure established by the commission's rules.

**History:** 1972, Act 230, Eff. Jan. 1, 1973;—Am. 1974, Act 180, Imd. Eff. June 27, 1974;—Am. 1978, Act 442, Imd. Eff. Oct. 9, 1978;—Am. 2001, Act 164, Imd. Eff. Nov. 7, 2001.

**Popular name:** Act 230

**Popular name:** Uniform Construction Code

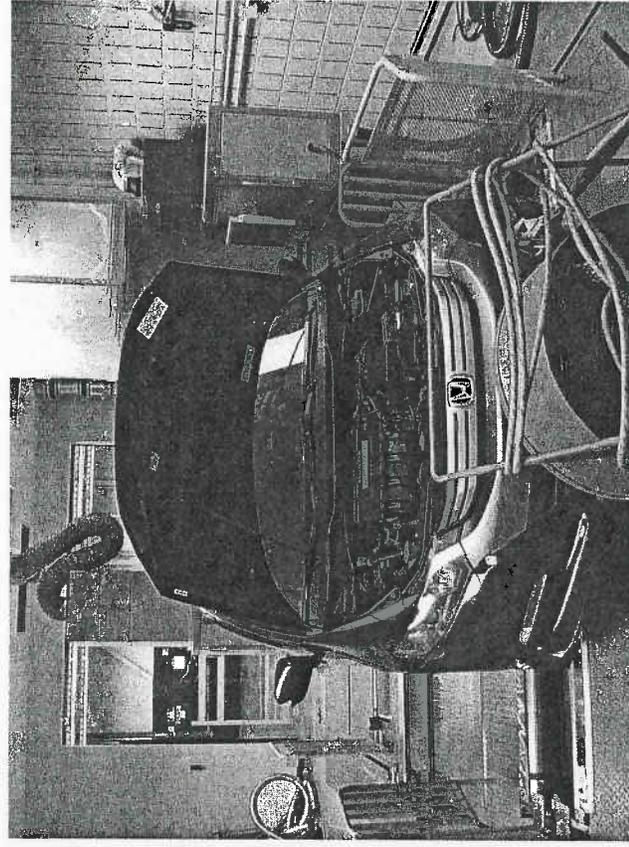
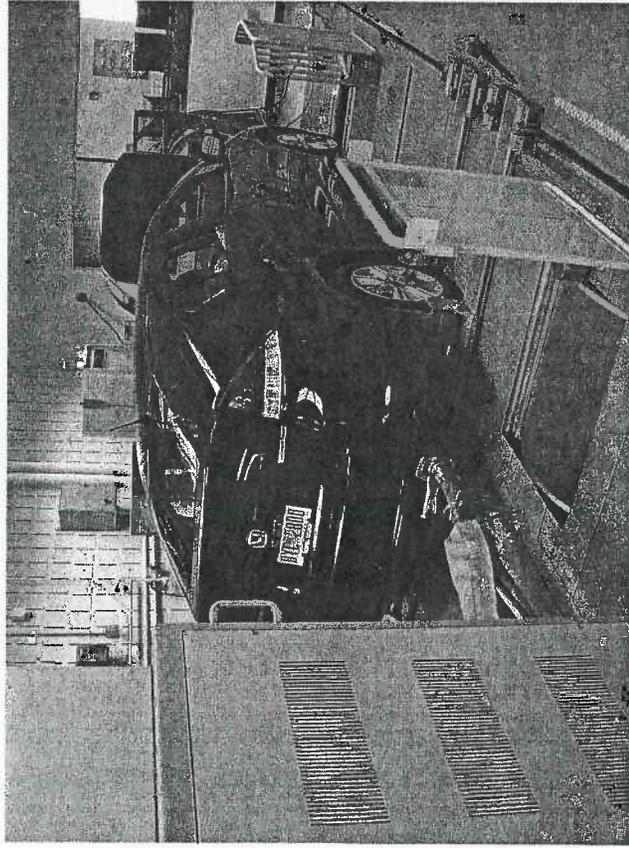
**Administrative rules:** R 408.30101 et seq. of the Michigan Administrative Code.

**ANN ARBOR BBA APPEAL NO. 16-0259**

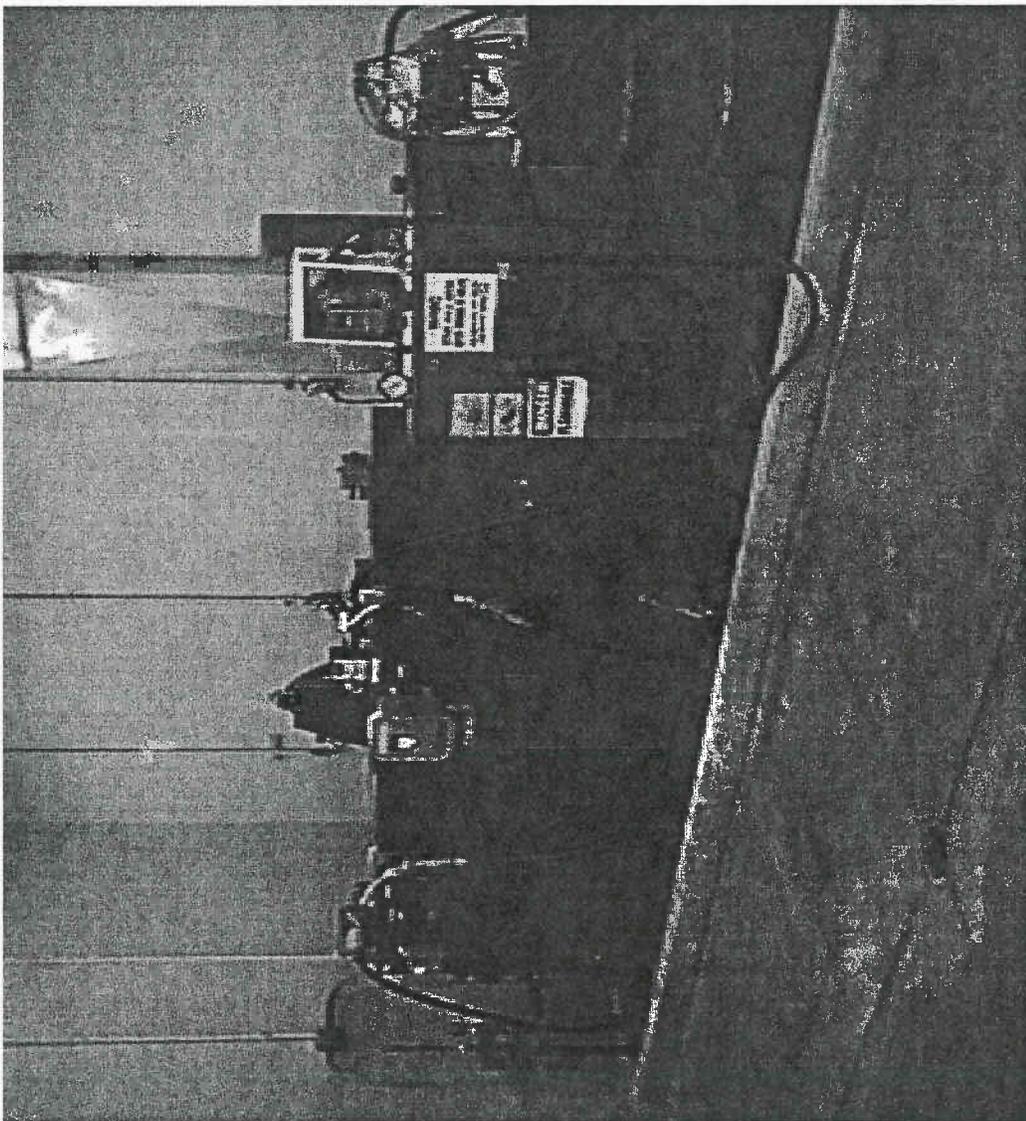
**AMERICAN HONDA MOTOR COMPANY, INC.  
RE: 3947 RESEARCH PARK DRIVE**

**PHOTOGRAPHS SHOWN DURING  
FEBRUARY 24, 2016 BBA HEARING**

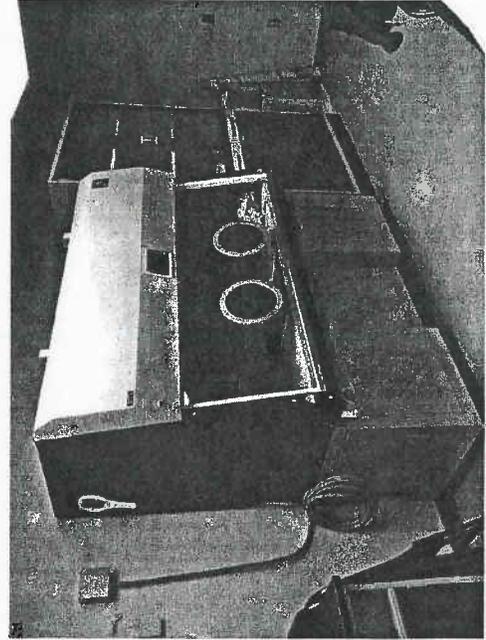
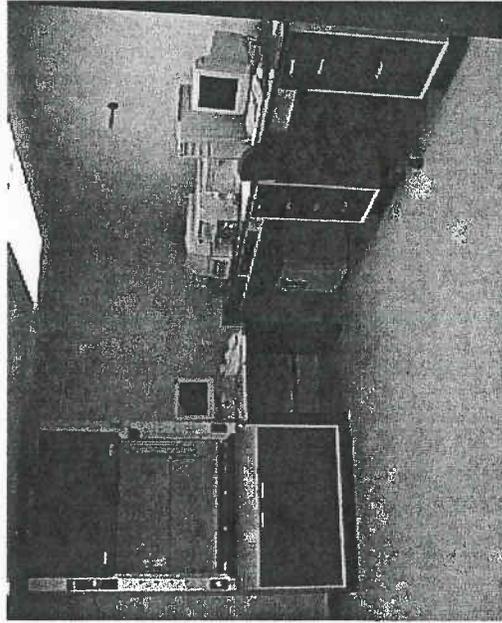
# Cell #2 4WD dyno [New in 2008]



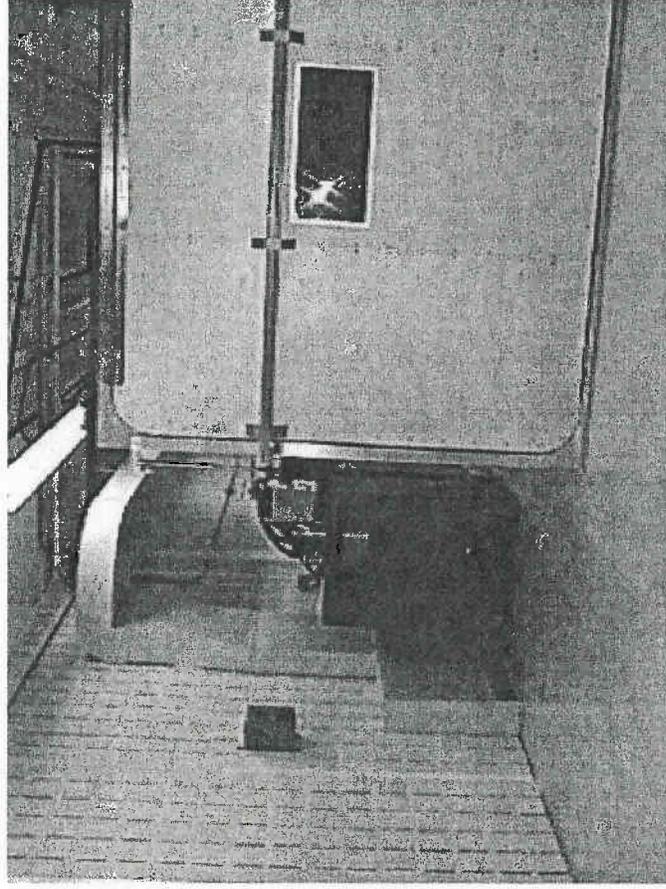
# Fuel Carts



# Chemistry Room (HPLC + Future PM)



# Evap/ORVR SHED





*Parker Engineering & Design, LLC*  
PO Box 0070  
Holly, Michigan 48442-0070  
248-328-9137 / FAX 248-328-9138

**To:** City of Ann Arbor  
Planning and Development Services Unit

**Attention:** Mr. Craig Strong

**From:** Daniel Parker, P.E.

**Subject:** Supporting Documentation for Honda Test Cell Classification

**April 8, 2016**

This letter and accompanying documentation are a follow-up to the meeting between Honda and the City of Ann Arbor on April 1, 2016. Discussion at the meeting included the basis for the classification of the Chassis Dynamometer Test Cell and below grade area as Class I, Division 2. The City requested documentation supporting both the classification and my statements that NFPA guidelines state that facility history, among other factors, should be a consideration when making that determination.

I continue to support the original engineer's classification of the Test Cell and below grade areas as unclassified, using the Minor Repair Garage special occupancy classification. I believe this classification is acceptable and appropriate, and consistent with the guidelines for classification in the NEC and supporting documents. The basis for this determination is covered in detail in the Hazard Review Report of March 8, 2015, and the BBA Expert Report, dated January 8, 2016. It is not repeated here.

The discussion at the April 1, 2016 meeting focused on my classification of the Test Cell and below grade area as Class I, Division 2, reduced to unclassified using the protection method of Gas Detection and Alarming, in the event that the Minor Repair Garage classification is rejected. The City argued that the area should be Class I, Division 1, with reduction to unclassified using Gas Detection and removal of power in the event of an alarm. The difference is the initial starting point for classification as Class I, Division 1, and the resulting requirement for the removal of power.

My determination that the cell be classified Class I, Division 2, and supporting arguments for that classification have been provided in much detail in the Hazard Review Report, section 8.1, dated March 24, 2015, and in the Expert Report for the Building Board of Appeals, section 3.2, dated January 8, 2016. This letter includes much of that same information, along with additional supporting information and references.

The determination of the initial classification of the area is quite straightforward. The National Electric Code provides 3 clear conditions that determine that an area should be classified as Class I, Division 1, and these conditions do not exist at Honda. Similarly, the NEC provides 3 conditions that could classify an area as Class I, Division 2. One of the conditions is a clear match for the conditions at Honda. Additionally, NFPA 497 provides an example of a Class I, Division 2 use that is also a match of the conditions at Honda. It is notable that NFPA 497 specifically states that the classification is based upon the possibility that an ignitable mixture may occur. It is not based upon the characteristics of the electrical equipment in the area. The City of Ann Arbor has previously argued that the classification should be more restrictive due to the equipment used in the area.

After determination of the initial classification is made, it is necessary to determine which protection method can be applied to reduce the area to unclassified.

The NEC specifically allows the use of Gas Detection as one of these methods. The NEC does not directly address a requirement for the removal of power. NFPA document Electrical Installations in Hazardous Locations does, and specifically states that in a Class I, Division 2 area, with adequate ventilation (6 air changes per hour – Honda has it), Gas Detection may be used without the need for removal of power. This book is authored by two NFPA chief electrical engineers and an NFPA principle flammable liquids engineer. The author Mark Earley is also the chief editor of the 2011 National Electric Code Handbook.

The following information includes specific references and extracts supporting the above discussion, and Honda's position that removal of power is not required by the codes. It includes additional references to support my prior statements that facility history and experience, volume of potential leaks, and adequate ventilation, among other factors, should be considered when classifying an area.

My evaluation and determination of the classification of the Test Cell and below grade area is based primarily upon the following documents:

NFPA 70	National Electric Code (NEC)	Article 500
NFPA 30	Flammable and Combustible Liquids Code	
NFPA 497	Recommended Practice for the Classification of Flammable Liquids, Gases or Vapors and of Hazardous (Classified) Locations for Electrical Installations	
NFPA publication	Electrical Installations in Hazardous Locations.	

The National Electric Code (NEC) provides the definitions of Classified Areas and acceptable Protection Methods within them. The NEC and NEC handbook specifically reference the other documents. (NEC 500.4) **(Ref A1)**

NFPA 30 details the requirements for Flammable and Combustible Liquids. NFPA 497 provides details on how to classify Hazardous Locations. Electrical Installations in Hazardous Locations provides further detail and guidelines for area classification and the use of equipment in hazardous areas.

Pertinent extracts from these sources are included at the end of this document, and notated with bold parenthesis in the body of this document.

## Classification as Class I, Division 2

Article 500 of the NEC is used to classify a location. NEC 500.5 (B) is used to classify a location as either Class I Division 1, or Class I, Division 2. (NEC 500.5(B)) (Ref A3)

The classification is based upon likelihood that a flammable or combustible concentration is present, (NEC 500.5 (A) (Ref A2), and the possibility that an ignitable mixture may occur. (NFPA 497, 5.1) (Ref B2) The classification *is not based upon* the electrical equipment contained within the area.

In accordance with Article 500, the area can at most be classified as Class I, Division II.

### ***Why not Class I, Division 1: (NEC 500.5 (B)(1)) (Ref A3)***

The following paragraph addresses each of the conditions contained in NEC 500 for classification as a Class I, Division 1 location. The area does not meet any of these conditions, and therefore need not be classified as Class I, Division 1. There are no other conditions in the NEC that require classification of an area as Class I, Division 1.

- It does not normally contain ignitable concentrations of vapors
- Ignitable concentrations of vapors do not normally exist due to repairs, maintenance or because of leakage
- A condition does not exist where breakdown or faulty operation which might release ignitable concentrations of vapors and would also cause simultaneous failure of electrical equipment so as to directly cause the equipment to become a source of ignition.

### ***Why at most Class I, Division 2: (NEC 500.5 (B)(2)) (Ref A3)***

The following paragraph addresses the three conditions that determine if an area may be Class I, Division 2. The first condition effectively describes exactly the condition within the test cell at Honda – therefore the area could be classified Class I, Division 2. The second two conditions are not present in the test cell or basement at all, and therefore neither of these conditions apply nor require the use of ventilation to achieve the Class I, Division 2 classification. Note that where ventilation is a requirement for classification as a Class I, Division 2 area, it is used to eliminate vapors which would otherwise normally or occasionally be present during normal operation. This is not the case in the test cell or below grade areas.

- The area is an area in which flammable liquid-produced vapors are handled or processed, but in which the liquids and vapors are normally confined within closed containers from which they can escape only in the case of an accidental rupture or breakdown of such containers or equipment.
- Ignitable concentrations are not normally prevented by ventilation – they are normally not present at all. A failure of ventilation alone will not cause a hazardous condition.
- Ignitable concentrations are not occasionally communicated from adjoining areas and prevented by positive ventilation. Ignitable concentrations are normally not present.

### ***NFPA Example of Fuel Tank classified as Class I, Division II***

NFPA 497 5.2.2.1 specifically considers an example matching the use at Honda for a vehicle fuel tank, and classifies the area surrounding the tank as Class I, Division 2:

“As an example, consider a vessel containing liquid hydrocarbons (the source) that release combustible materials only under abnormal conditions. In this case, there is no Division 1 location because the vessel is normally tight. To release vapor, the vessel would have to leak, and that would not be normal. Thus, the vessel is surrounded by a Division 2 location.” (NFPA 497-5.2.2.1) (Ref B3, B4)

### **Use of Protection Methods to Reduce Classification**

The NEC allows specific protection methods to permit the use of equipment rated for non-hazardous areas in a hazardous area, effectively reducing the classification from Class I, Division 2 to non-hazardous. These methods are discussed in section 500.7. (NEC 500.7) (Ref A5)

The specific protection method appropriate for the Honda Test Cell application is Gas Detection and Alarming. (NEC 500.7(K)) (Ref A5) In a Class I, Division 1 area, this would require removal of power. ***However, in a Class I, Division 2 area, removal of power is not required.*** (NFPA, Page 273, 4-2.2.7) (Ref C3)

Therefore, in the Class I, Division 2 area at Honda, it is sufficient to provide Gas Detection and Alarms, and permit the operators to take necessary action to reduce the hazards.

### **Additional Considerations for Classification**

The following citations from code sources indicate some of the considerations that must be taken into account when classifying an area.

#### ***Consideration of Simultaneous Failures***

Because Class I, Division 1 areas may normally contain a hazardous atmosphere, electrical installations are required to be designed and installed so that neither normal nor abnormal operation of the system will cause a release of ignition capable energy (spark, flame or hot gas).

Class I, Division 2 areas do not normally contain a hazardous atmosphere, and electrical installations are required to be “designed and installed so that normal operation of the electrical system will not cause a release of ignition capable energy. ***Protection against ignition from a breakdown of the electrical system or any component of it is not provided based upon the expectation that simultaneous failure of the electrical system and release of an ignitable mixture is unlikely.***” (NFPA, Page 60, 3-2) (Ref C1)

#### ***Frequency of Release***

NFPA 497, 5.4.1 and 5.4.1(1) state that there may be some cases where the release of ignitable mixtures is so infrequent that area classification is not necessary. This could include areas with adequate ventilation where materials are contained in suitable, well-maintained closed piping systems. Considering that Honda has operated for more than 40 years without a release, the fuel system is checked for leaks before testing, and the design of automotive fuel systems is robust with a very low incidence of failure, this condition could be applied to Honda. (NFPA 497, 5.4.1, 5.4.1(1)) (Ref B4)

### ***Adequate Ventilation***

Adequate ventilation is defined in NFPA 497 3.3.1 as a ventilation rate that provides either 6 air changes per hour, or 1 cfm per square foot of floor area, or similar criteria that prevent the accumulation of significant quantities of vapor-air concentrations from exceeding 25% of the lower flammable limit. (NFPA 497 – 3.3.1) **(Ref B1)** (NFPA, Page 69, 3-2.3.2.3) **(Ref C2)**

Note that this definition does not say that adequate ventilation must prevent *any* accumulation of concentrations exceeding 25%.

NEC states that the adequacy of ventilation is a factor which merits consideration when determining a classification. (NEC 500.5 (B) (2) Informational Note 1) **(Ref A4)**

### ***Prior Experience and Facility History***

NEC states that the record of the industry or business is a factor which merits consideration when determining a classification. (NEC 500.5 (B) (2) Informational Note 1) **(Ref A4)**

NFPA 497 states that an area may not need to be classified as hazardous, simply because a potentially hazardous concentration may exist. It states that “Experience has shown that the release of ignitable mixtures from some operations and apparatus is so infrequent that the area classification is not necessary. For example, it is not usually necessary to classify the following locations where combustible materials are processed, stored or handled:

(1) Locations that have adequate ventilation, where combustible materials are contained within suitable, well-maintained, closed piping systems.” (NFPA 497-5.4.1) **(Ref B5)**

NFPA 497 further states that “when classifying buildings, careful evaluation of prior experience with the same or similar installations should be made. It is not enough to identify a potential source of the combustible material within the building and proceed immediately to defining the extent of either Class I, Division 1 or 2 areas; or Class I, Zone 1 or Zone 2 classified areas. ***Where experience indicates that a particular design concept is sound, a more hazardous classification for similar installations may not be justified.*** Furthermore, it is conceivable that an area might be reclassified from either a Class I, Division 1 to a Class I, Division 2 or from a Class I, Division 2 to Unclassified, or from Class I, Zone 1 to Class I, Zone 2, or from and Class I, Zone 2 to unclassified based on experience.” (NFPA 497 5.5.4) **(Ref B6)**

NFPA 497 states that for an existing facility, the individual plant experience is extremely important in classifying areas within the plant. (NFPA 497 5.8.2.2) **(Ref B8)**

### ***Volume of Combustible Material***

NEC states that the quantity of flammable material is a factor which merits consideration when determining a classification. (NEC 500.5 (B) (2) Informational Note 1) **(Ref A4)**

Per NFPA 497, “the volume of combustible material released is of extreme importance in determining the extent of a hazardous (classified) location, and it is this consideration that necessitates the greatest application of sound engineering judgment.” **(NFPA 497 5.5.6) (Ref B7)**

## Code References and Extracts

### **A National Electric Code, NFPA 70, 2011 Edition**

#### **A1 500.4 (B) Referenced Standards**

Informational Note No. 2: For further information on the classification of locations see NFPA 30-2008, *Flammable and Combustible Liquids Code*; . . . NFPA 497-2008, *Recommended Practice for the Classification of Flammable Liquids, Gases or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*.

#### **A2 500.5 (A) Classification of Locations**

Locations shall be classified depending upon the properties of the flammable gas, flammable liquid produced vapor, combustible liquid produced vapors, combustible dusts, or fibers / flyings that may be present, and the likelihood that a flammable or combustible concentration or quantity is present.

#### **A3 (B) Class I Locations**

Class I locations are those in which flammable gases, flammable liquid produced vapors, or combustible liquid-produced vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures. Class I locations shall include those specified in 500.5(B)(1) and (B)(2).

**(1) Class I, Division 1.** A Class I, Division 1 location is a location

- (1) In which ignitable concentrations of flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors can exist under normal operating conditions, or
- (2) In which ignitable concentrations of such flammable gases, flammable liquid-produced vapors, or combustible liquids above their flash points may exist frequently because of repair or maintenance operations or because of leakage, or
- (3) In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors might also cause simultaneous failure of electrical equipment in such a way as to directly cause the electrical equipment to become a source of ignition.

**(2) Class I, Division 2.** A Class I, Division 2 location is a location

- (1) In which volatile flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors are handled, processed, or used, but in which the liquids, vapors or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems or in case of abnormal operation of equipment, or
- (2) In which concentrations of flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors, are normally prevented by positive mechanical ventilation and which might become hazardous through failure or abnormal operation of the ventilation equipment, or

- (3) That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of flammable gases, flammable liquid-produced vapors, or combustible liquid-produced vapors above their flash points might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

**A4 500.5 (B)(2) Informational Note No. 1:**

This classification usually includes locations where volatile flammable liquids or flammable gases or vapors are used but that, in the judgment of the authority having jurisdiction, would become hazardous only in the case of an accident or some unusual operating condition. The quantity of flammable material that might escape in case of an accident, the adequacy of the ventilating equipment, the total area involved, and the record of the industry or business with regard to explosions or fires are all factors that merit consideration in determining the classification and extent of each location.

**A5 500.7 Protection Techniques**

**(K) Combustible Gas Detection System**

A combustible gas detection system shall be permitted as a means of protection in industrial establishments with restricted public access and where the conditions of maintenance and supervision ensure that only qualified persons service the installation. Where such a system is installed, equipment specified in 500.7(K)(1), (K)(2), and (K)(3) shall be permitted.

The type of detection equipment, its listing, installation location (s), alarm and shutdown criteria, and calibration frequency shall be documented when combustible gas detectors are used as a protection technique.

**(2) Interior of a Building.** In a building located in, or with an opening into, a Class I, Division 2 location, where the interior does not contain a source of flammable gas or vapor, electrical equipment for unclassified locations shall be permitted. Combustible gas detection equipment shall be listed for Class I, Division 1 or Class I, Division 2, for the appropriate material group, and for the detection of the specific gas or vapor to be encountered.

- B**      **NFPA 497**  
**Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas**  
**2012 Edition**
- B1**      **3.3.1 Adequate Ventilation.** A ventilation rate that affords either 6 air changes per hour, or 1 cfm per square foot of floor area, or other similar criterion that prevent the accumulation of significant quantities of vapor-air concentrations from exceeding 25 percent of the lower flammable limit.
- B2**      **Chapter 5 Classification of Class I (Combustible Material) Areas**  
**5.1 General**      The decision to classify an area as hazardous is based on the possibility that an ignitable mixture may occur. Having decided that an area should be classified, the next step is to determine which classification methodology should be utilized: the U.S. traditional NEC articles 500 and 501, Class, Division, Group; or NEC article 505, Class, Zone, Group.
- B3**      **5.2.2 Division 2 Classified Locations**  
The criterion for a Division 2 location is whether the location is likely to have ignitable mixtures present only under abnormal conditions. The term *abnormal* is used here in a limited sense and does not include a major catastrophe.
- B4**      **5.2.2.1** As an example, consider a vessel containing liquid hydrocarbons (the source) that release combustible materials only under abnormal conditions. In this case, there is no Division 1 location because the vessel is normally tight. To release vapor, the vessel would have to leak, and that would not be normal. Thus, the vessel is surrounded by a Division 2 location.
- B5**      **5.4 Unclassified Locations**  
**5.4.1** Experience has shown that the release of ignitable mixtures from some operations and apparatus is so infrequent that that area classification is not necessary. For example it is not usually necessary to classify the following locations where combustible materials are processed, stored or handled:
- (1)      Locations that have adequate ventilation, where combustible materials are contained within suitable, well-maintained, closed piping systems.
  - (2)      Locations that lack adequate ventilation, but where piping systems are without valves, fittings, flanges or similar accessories that are prone to leaks.
  - (3)      Locations where combustible materials are stored in suitable containers.
  - (4)      Locations where the use of combustible liquids, or flammable liquids or gases, will not produce gas or vapor sufficient to reach 25% of the lower flammable limit (LFL) of that combustible material.

**B6 5.5 Extent of Classified Locations**

**5.5.4** When classifying buildings, careful evaluation of prior experience with the same or similar installations should be made. It is not enough to identify a potential source of the combustible material within the building and proceed immediately to defining the extent of either Class I, Division 1 or 2 areas; or Class I, Zone 1 or Zone 2 classified areas. Where experience indicates that a particular design concept is sound, a more hazardous classification for similar installations may not be justified. Furthermore, it is conceivable that an area might be reclassified from either a Class I, Division 1 to a Class I, Division 2 or from a Class I, Division 2 to Unclassified, or from Class I, Zone 1 to Class I, Zone 2, or from and Class I, Zone 2 to unclassified based on experience.

**B7 5.5.6** The volume of combustible material released is of extreme importance in determining the extent of a hazardous (classified) location, and it is this consideration that necessitates the greatest application of sound engineering judgment. However, one cannot lose sight of the purpose of this judgment; the area is classified solely for the installation of electrical equipment.

**B8 5.8 Procedure for Classifying Locations**

**5.8.2.2 Existing Facility History**

For an individual facility, the individual plant experience is extremely important in classifying areas within the plant. Both operation and maintenance personnel in the actual plant should be asked the following questions:

- (1) Have there been instances of leaks?
- (2) Do leaks occur frequently?
- (3) Do leaks occur during normal or abnormal operation?
- (4) Is the equipment in good condition, questionable condition, or in need of repair?
- (5) Do maintenance practice result in the formation of ignitable mixtures?
- (6) Does the routine flushing of process lines, charging of filters, opening of equipment, and so forth result in the formation of ignitable mixtures?

**C Electrical Installations in Hazardous Locations – 3<sup>rd</sup> Edition**  
NFPA – Peter J. Schram, Robert P. Benedetti, Mark W. Early

**C1 3-2 Class I Hazardous Locations**

...  
Electrical installations suitable for Class I, Division 1 areas must be designed and installed so that neither normal nor abnormal operation of the system will cause a release of ignition capable energy such as a spark, flame or hot gas. Also, components of the electrical system must not reach temperatures high enough to ignite a surrounding atmosphere containing the ignitable mixture. Electrical installations suitable for Class I, Division 2 locations are designed and installed so that normal operation of the electrical system will not cause a release of ignition-capable energy. Protection against ignition from a breakdown of the electrical system or any component of it is *not* provided based upon the expectation that simultaneous failure of the electrical system and release of an ignitable mixture is unlikely. (Page 60)

**C2 3.2.3.2.3 Ventilation**

...  
Six air changes per hour has traditionally been considered the minimum effective ventilation rate to maintain an atmosphere of not more than 25% LFL. (Page 69)

**C3 4 Equipment Protection Systems**

**4-2.2 Division 2**

**4-2.2.7 Combustible Gas Detection Systems**

These systems are essentially the same as those for use in Class I, Division 1 locations (See section 4-2.1.3 of this book), except they may initiate an alarm instead of a shutdown, and may be set to actuate at 50 percent of the lower flammable limit. The NEC permits such a system to protect electrical equipment for Unclassified locations (nonhazardous location equipment) if they are located in, or with an opening into, a Class I, Division 2 location where the interior does not contain a source of flammable gas or vapor. In other words, they can be used, in effect, to change the location from Division 2 to nonhazardous if all the conditions are met. (Page 273)



## CITY OF ANN ARBOR, MICHIGAN

Community Services Area  
Planning & Development Services Unit  
301 E. Huron St, P.O. Box 8647, Ann Arbor, Michigan 48107-8647  
[www.a2gov.org](http://www.a2gov.org)  
1-734-794-6263

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February 21, 2016

Building Board of Appeals  
City of Ann Arbor

Re: American Honda Addition  
3947 Research Park Dr.  
Ann Arbor, MI 48108

Dear Board Members:

American Honda received a permit in December of 2013 to construct an addition onto their existing automotive testing and research development facility located at the above address. At some point in November of 2014 field inspections revealed concerns with regard to the installation of hazardous gas detection systems, electrical equipment installations and mechanical ventilations systems. At that point the previous Building Official hired an outside consultant (Ino-Tek) with expertise in the Emergency Alarm Systems (EAS) field. Ino-Tek quickly determined that the submitted and previously approved plans had lacked the sufficient information necessary for a comprehensive review and recommended that the City require Honda to submit a "Hazard Review Report", prepared by a qualified company, per the 2009 Michigan Building Code. This report should contain information such as;

1. Identification of all hazardous materials being used, quantities and their hazard classifications.
2. Hazard classifications for control areas such as the machinery room, basement dynamometer room (pits), automobile test cells, hazardous gas bottle rooms and gasoline storage room.
3. A comprehensive set of drawings, including riser diagrams for the proposed EAS, all mechanical ventilation systems and electrical equipment.

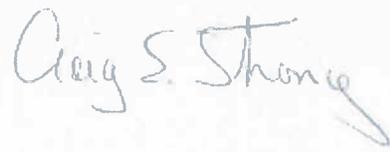
Upon my arrival as the City's Building Official, in December of 2014, I reviewed a request from Honda to accept Parker Engineering as a qualified company as they claimed to have the necessary qualifications to prepare the Hazard Review Report. Since that time we have gone back and forth with submittals, reviews and meetings and frankly are at an impasse.

Honda's team feels that we are misinterpreting the codes and have filed an appeal for your consideration. The following code section should be used in determining a final resolution for each of their appeals listed in my enclosed report.

**113.1 Means of appeal.** An interested person may appeal a decision of the enforcing agency to the board of appeals in accordance with the act. An application for appeal shall be based on a claim that the true intent of the code or the rules governing construction has been incorrectly interpreted, the provisions of the code do not apply, or an equal or better form of construction is proposed. The decision of a local board of appeals may be appealed to the construction code commission in accordance with the act and time frames.

If you have any questions, please call me at 734 652-6813.

Sincerely,

A handwritten signature in cursive script that reads "Craig E. Strong". The signature is written in dark ink and is positioned below the word "Sincerely,".

Craig E. Strong, Building Official  
City of Ann Arbor