



March 19, 2015

Update to SMMUSD Board

Juan Cabrillo Elementary School (JCES)

Malibu High School (MHS)



Agenda

- Overview of ENVIRON's Work
- Preliminary Environmental Assessment (PEA)
- Polychlorinated Biphenyls (PCBs) in Building Materials
- Costs of Building Material Remedial Options



ENVIRON's Charge from District

- Assist the District in achieving its goal of assuring employees and the community that the schools within the District are healthy learning and working environments in a fiscally responsible manner and satisfying regulatory requirements
- Principles used in our work
 - Be protective of human health
 - Implement a science-driven approach to identify and implement solutions – essential for Agency approvals
 - Achieve regulatory agency approvals/concurrence
 - Employ best practices from other projects
 - Be implementable in all District schools
 - Be considerate of District resources



Regulatory Agency Roles

- DTSC's Role - Lead Agency for School Subsurface Investigations
 - Statutory authority to oversee California school subsurface evaluations
 - Directs Preliminary Environmental Assessment (PEA) to investigate soil, soil gas, and groundwater outside buildings per District's Voluntary Investigation Agreement (VIA)
 - Evaluates potential presence of chemicals based on historical/current uses
 - Determines if JCES and MHS exposures are at safe levels per PEA guidance
- EPA's Role – Evaluation of Potential PCB-impacted Building Materials under Toxic Substance Control Act (TSCA)
 - Exclusive jurisdiction of EPA
 - Evaluates sample results
 - Evaluates potentially complete exposure pathways
 - Provides technical review of building inspections, best management practices (BMPs) and sampling plans
 - Approves removal and remediation plans
 - Determines if classroom/building conditions are protective of public health



Agency Approvals Require Scientific Approach

- Planning Documents for Investigation
 - Rooted in scientific principles
 - Based on agency statutes, regulations, and guidance
 - Open for stakeholder comments
 - Follows established methods and process
 - Reflective of regulatory requirements
- Investigation Execution
 - Follows approved plan
 - Uses scientific methods that allows for replication
 - Documentation (photos, field notes, Chain of Custody, etc.) of activities
- Scientific Reporting
 - Includes raw data, interpretation of results, Quality Assurance/Quality Control, conclusions



What's Been Done

- Thorough and exacting scientific studies, which can be found on the District's website
- PEA
 - Investigation with 525 samples analyzed
 - Localized removal action east of Building G
 - Results are acceptable for school uses
 - Land can be used for any purpose
- Building Materials
 - 250 air and 765 surface dust wipe samples taken
 - EPA made finding that there is no unreasonable risk at MHS or JCES
 - Collected data that shows any potential sources can be safely managed in place until the next renovation or demolition
 - EPA approved plan under TSCA
 - Removal scheduled (June) for MHS Library, 3 rooms in Building E and woodshop



Investigation Overall Conclusions

- PEA - Results were below screening thresholds for school use
- Building Materials - EPA made finding MHS and JCES are being managed in a manner protective of human health

EPA research studies show that primary health concerns from PCBs in building materials derive from inhalation of contaminated air; and secondarily from contact with PCBs in dust and subsequent incidental ingestion⁵. Overall, the sampling data from the two schools demonstrate that these PCB exposure pathways are currently being addressed by the District's BMPs in a manner that protects public health. Thus, the District's undertaking of the BMPs, as verified by pre- and post-BMP sampling data, demonstrates that the TSCA standard for no unreasonable risk is currently being met at MHS and JCES.

10/31/2014 EPA approval letter to SMMUSD



Preliminary Environmental Assessment (PEA)

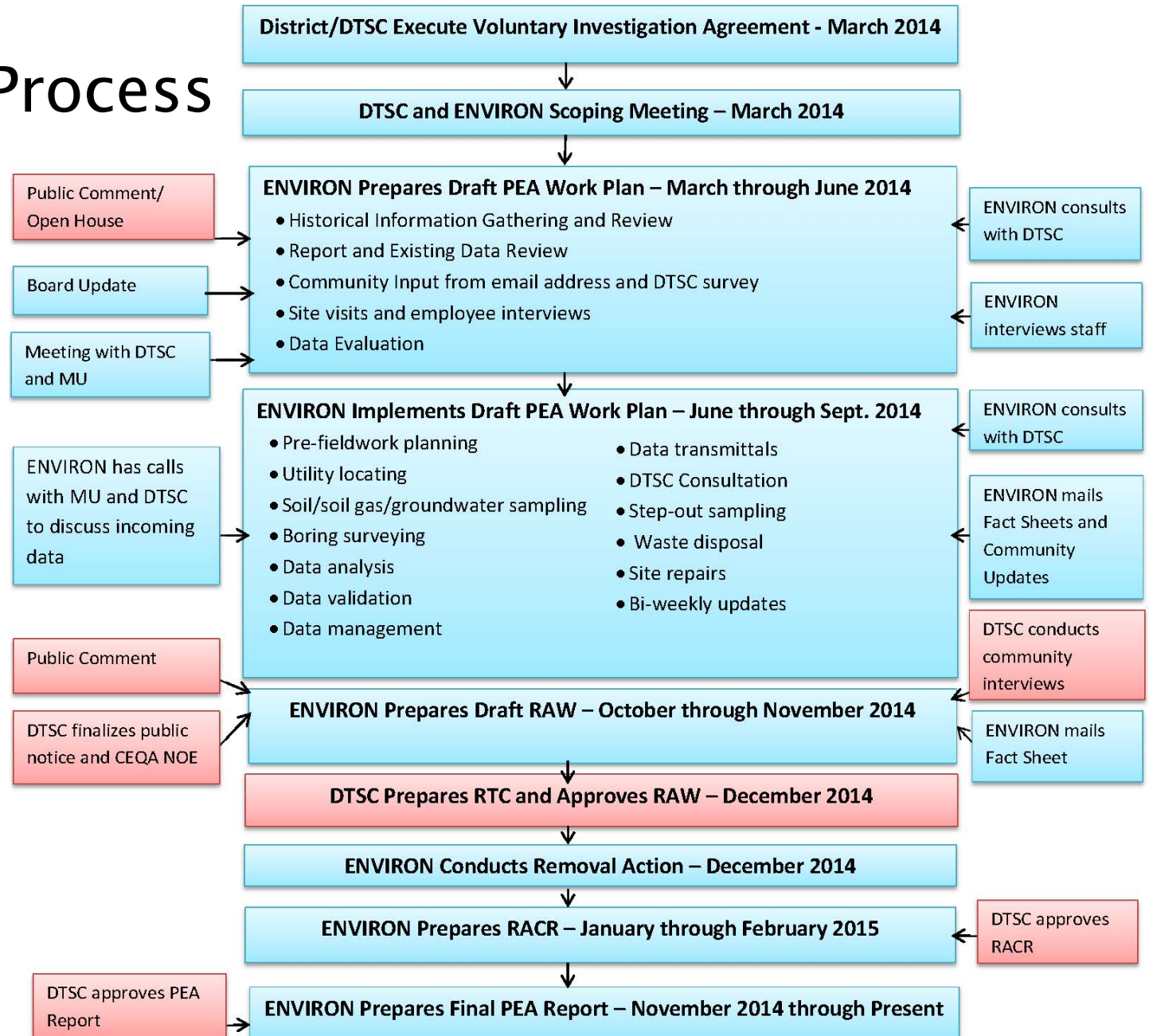


PEA Approach

- DTSC has statutory authority for environmental evaluations of schools (Schools Evaluation Division)
- District and DTSC executed VIA
- Evaluation vehicle is the PEA
 - Driven by scientific principles
 - Based on established regulations and vetted guidance
 - Incorporates all stakeholders
 - Follows prescribed and thorough process - NO SHORTCUTs
- Evaluate subsurface at JCES and MHS using a sound scientific approach to understand if schools are safe



PEA Process





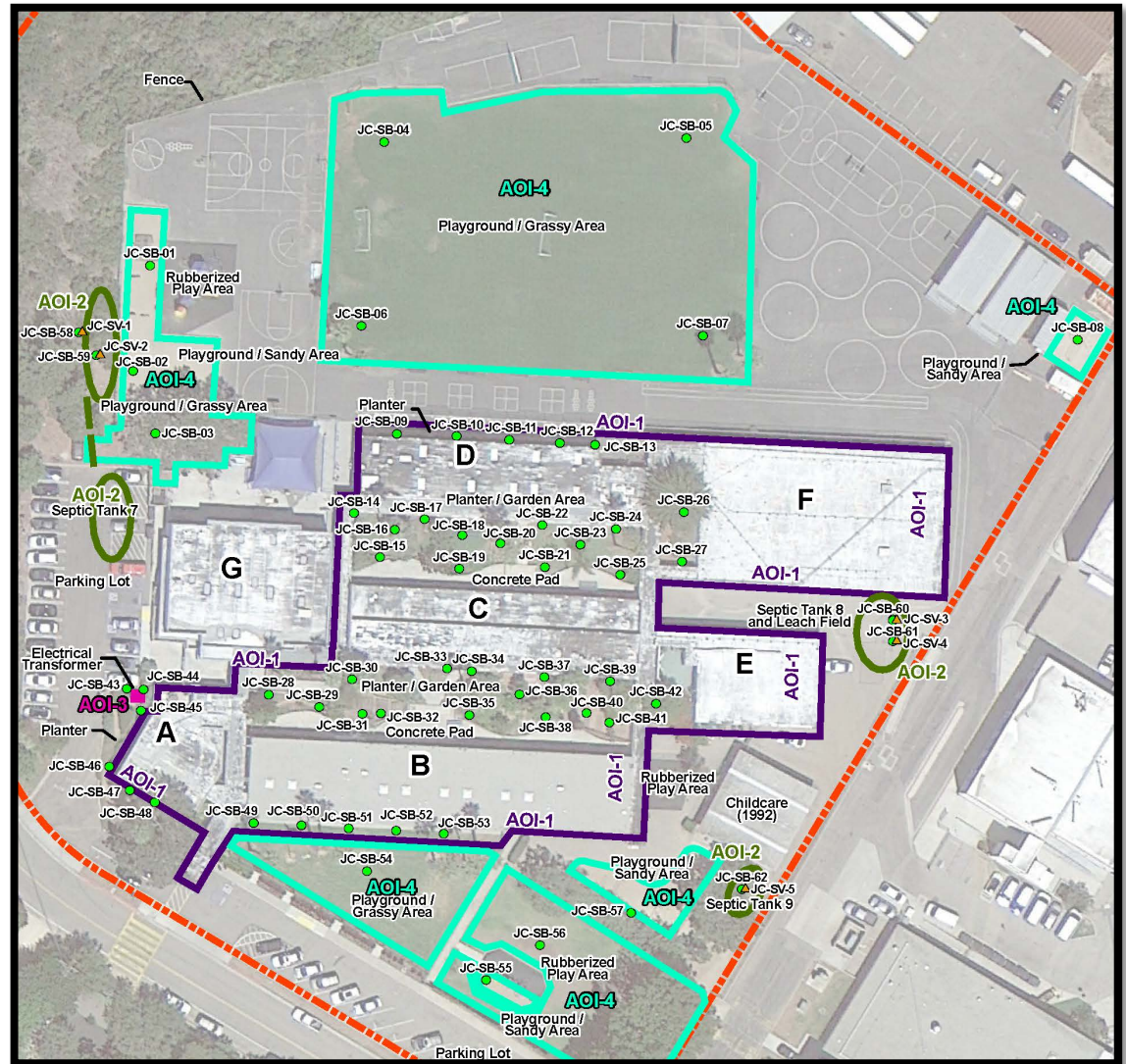
PEA Overview

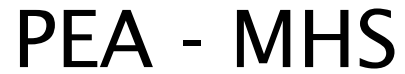
- Identified 18 Areas of Interest (AOIs) that led to extensive investigation
- Advanced 778 borings (742 soil and 26 soil gas)
- Analyzed 454 soil, 62 soil gas, and 9 groundwater samples (total 525 samples)
- Samples selectively analyzed for PCBs, pesticides, herbicides, metals, TPH, VOCs, SVOCs, and pH by state-certified laboratory
- Conducted third-party data validation



PEA - JCES

- 4 AOIs
- Analyzed samples:
 - 135 soil
 - 12 soil gas
 - 3 groundwater



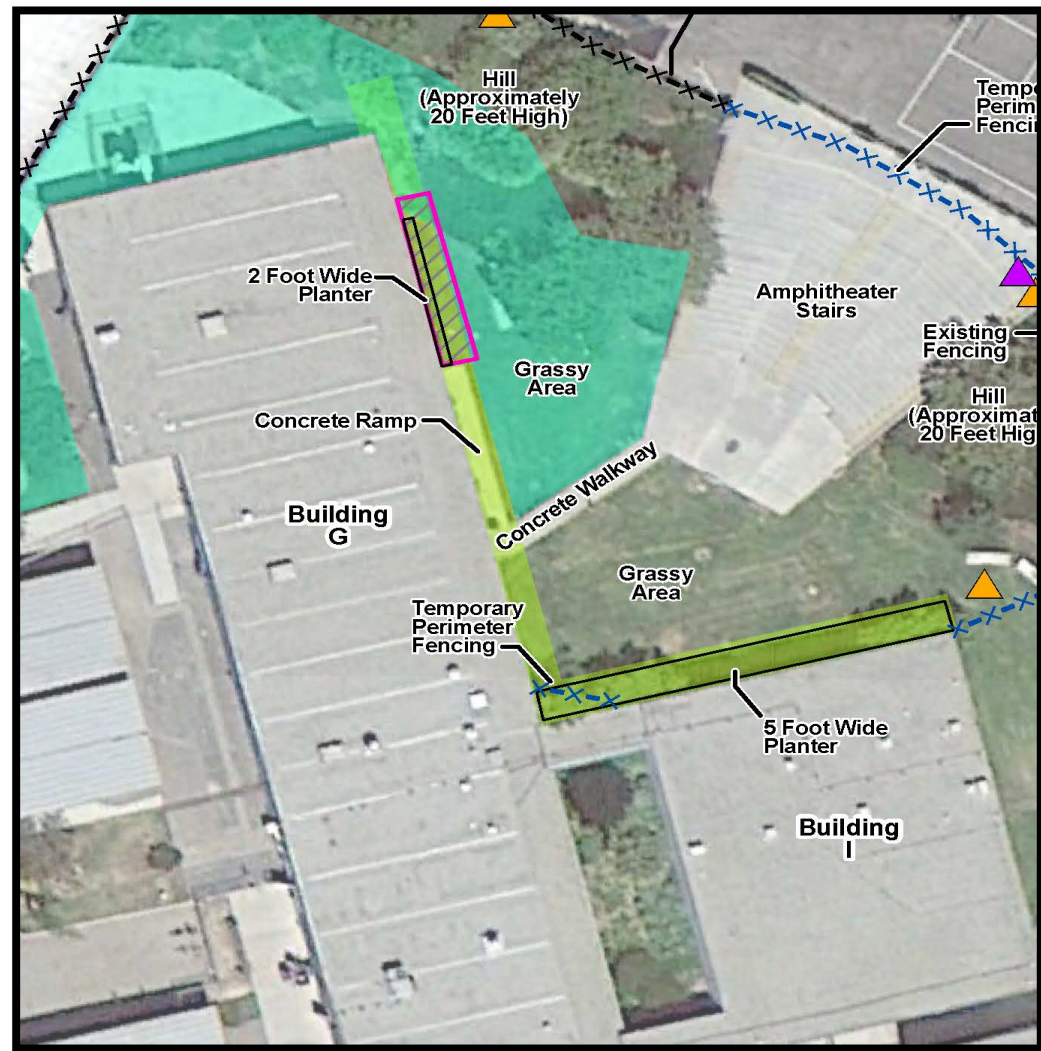


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- The map displays the University of Maryland Eastern Shore campus with various buildings, parking lots, and sports fields. Key features include:
- Buildings:** Gymnasium (2002), J, K, H, D, E, A, B/C, F, G, I, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UU, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ.
 - Parking Lots:** Multiple parking lots are labeled, including 'Parking Lot' and 'New Student Drop-Off'.
 - Sports Fields:** Baseball Field, Soccer Field, and other sports fields are marked.
 - Legend:** A legend in the bottom left corner identifies symbols for 'Area of Interest (AOI)', 'Legend', and 'Undeveloped'.
 - Scale Bar:** A scale bar in the bottom right corner indicates distances in feet (0, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000).



PCBs Removal Action at Building G Area

- Soil sampling results were below the DTSC risk thresholds for schools
- Excavation ensures area can be used for any purpose
- Excavated and disposed of approximately 15 yd³ of non-hazardous soil
- Expect No Further Action from DTSC





PEA Next Steps

- Investigation has been completed at both schools
- Localized removal action east of Building G is complete
- Removal Action report submitted to DTSC on February 20, 2015
- PEA Report to be delivered–April 2015
- Expect to receive final approvals from DTSC
 - April/May
 - No further investigation/remediation requested
 - Results are acceptable for school uses
 - Land can be used for any purpose



Polychlorinated Biphenyls (PCBs) in Building Materials



Toxic Substance Control Act (TSCA) - 101

- TSCA Regulations
 - Regulates many substances including use of PCBs
 - Intended to remove PCBs from the environment over time
 - Set 50 ppm standard for PCBs as a determination of prohibited use
 - Gives EPA authority to implement TSCA through regulation and guidance
- EPA's Schools Policy
 - EPA uses risk-based policy for regulation of PCBs, asbestos, and lead paint in schools and public buildings
 - Evaluates risk presented by exposure to building materials
 - If risk is low, materials are managed in place, removed at end of life, and then disposed of



Primary ENVIRON Efforts for SMMUSD (started March 2014)

- Comprehensive Plan applicable to any of the 16 schools in District
 - Used as basis for more specific next steps at MHS and JCES
- Development of Specific Plan for MHS/JCES
 - Supplemented on September 26, 2014
 - Approved by EPA on October 31, 2014
- Exposure monitoring pilot study
 - Summer 2014
 - Winter 2014/2015
 - Summer 2015
- Other services not related to MHS





ENVIRON's Approach

- EPA has oversight of PCBs in building materials
- Important resources utilized
 - EPA's TSCA regulations
 - EPA's guidelines, research, and recommendations
 - East Coast schools
 - ENVIRON's experience in EPA Region I and II

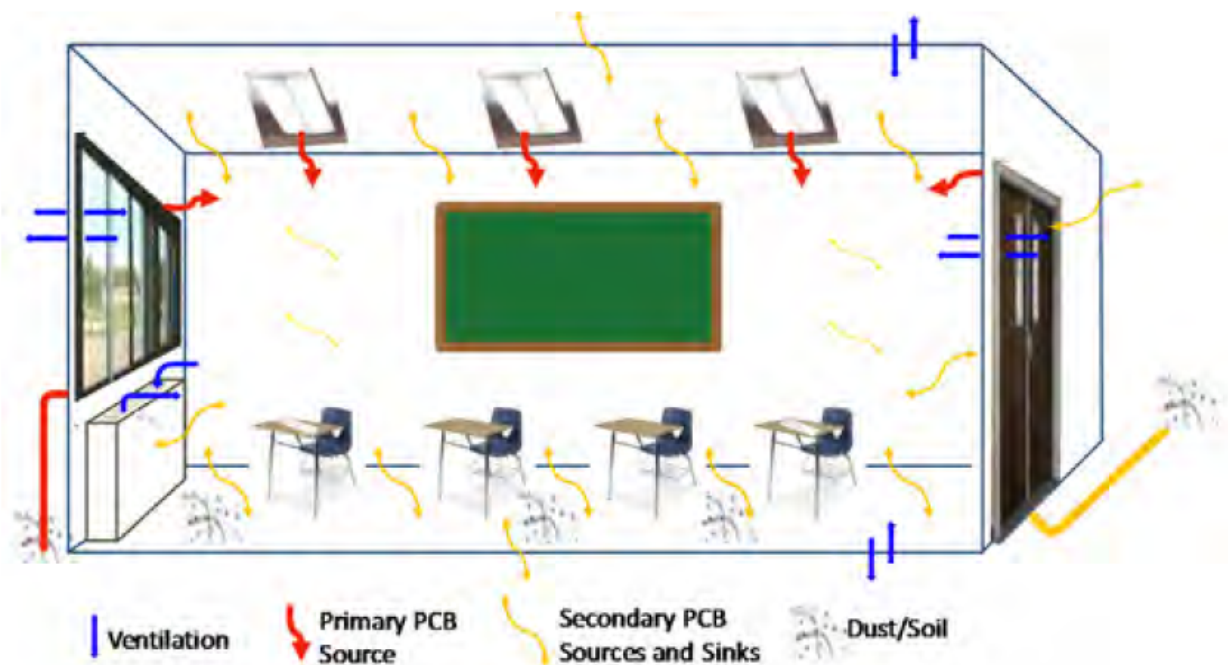


Key concepts from these relevant PCB resources

- Some sources can result in high airborne exposures (e.g., light ballast and associated leaks)
- Other sources may not result in high airborne exposures (e.g. caulk)
- Evaluation of exposures is needed to determine if schools are safe and to evaluate impact from potential sources
- Some building materials containing PCBs can be managed in place; lessons learned from asbestos and lead paint
- Removal of some materials is complex

Important to note: PCBs can be found in other materials besides caulk

- Multiple sources have been found in schools
 - Primary sources (e.g., fluorescent light ballasts, caulk, paint)
 - Secondary sources (e.g., concrete, wood, etc.)



Source: USEPA. 2012. September. Polychlorinated Biphenyls (PCBs) in School Buildings: Sources, Environmental Levels, and Exposures. Available online: http://www.epa.gov/pcbsincaulk/pdf/pcb_EPA600R12051_final.pdf



Key TSCA Compliance Accomplishment: SMMUSD's Approved Plan for MHS/JCES

- July 3, 2014 Site Specific Plan as supplemented on September 26, 2014 approved by EPA (10/31/14)
- Main features:
 - Specific Plan covers both manage-in-place elements (e.g. BMPs) and detailed remediation steps
 - Removal scheduled (June) for MHS Library, 3 rooms in Building E and woodshop
 - Additionally any specific caulk identified and verified to have PCBs ≥ 50 ppm, within a year or other timeframe as approved by EPA
 - Providing notification to EPA for additional areas
 - Includes removal of old light fixtures, some of which showed evidence of past ballasts leakage
 - Includes pilot monitoring study (air/wipe)

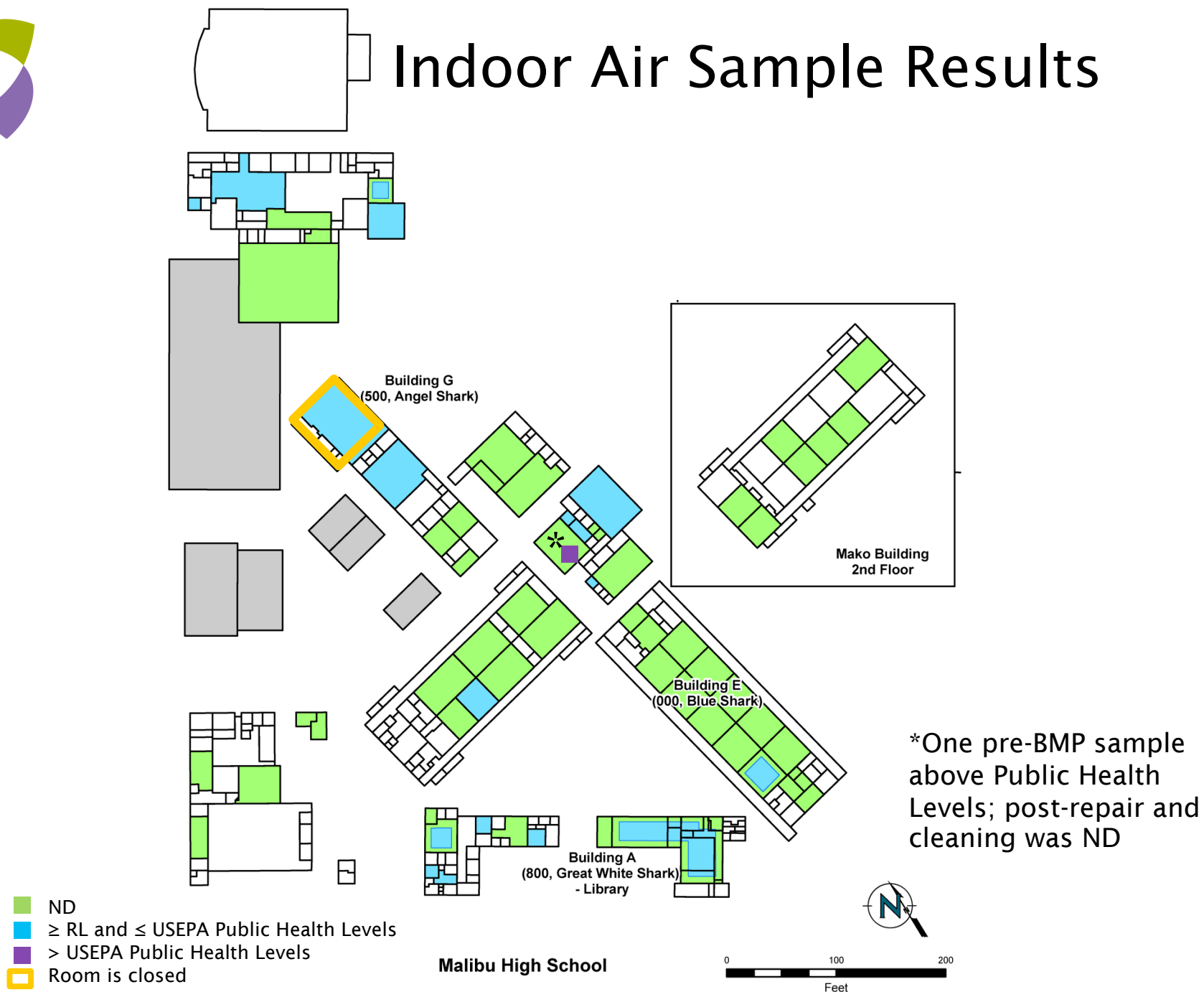


Key EPA School Policy Accomplishments at MHS/JCES

- PCB exposures (air/dust) are acceptable
 - 250 air and 765 surface wipe samples total to date
 - Results were below Region IX's no-further-action benchmarks
 - including rooms reportedly tested by third parties
 - Wipe samples: 85% Summer and 88% Winter samples were not detected
 - Air samples: 73% Summer and 100% Winter samples were not detected
 - EPA concurred that the data meet TSCA's standard for no unreasonable risk and do not present a public health risk
 - A majority of the buildings had acceptable exposure levels prior to annual BMP cleaning
 - Demonstrates that any potential sources in the schools are not contributing to unacceptable exposure levels

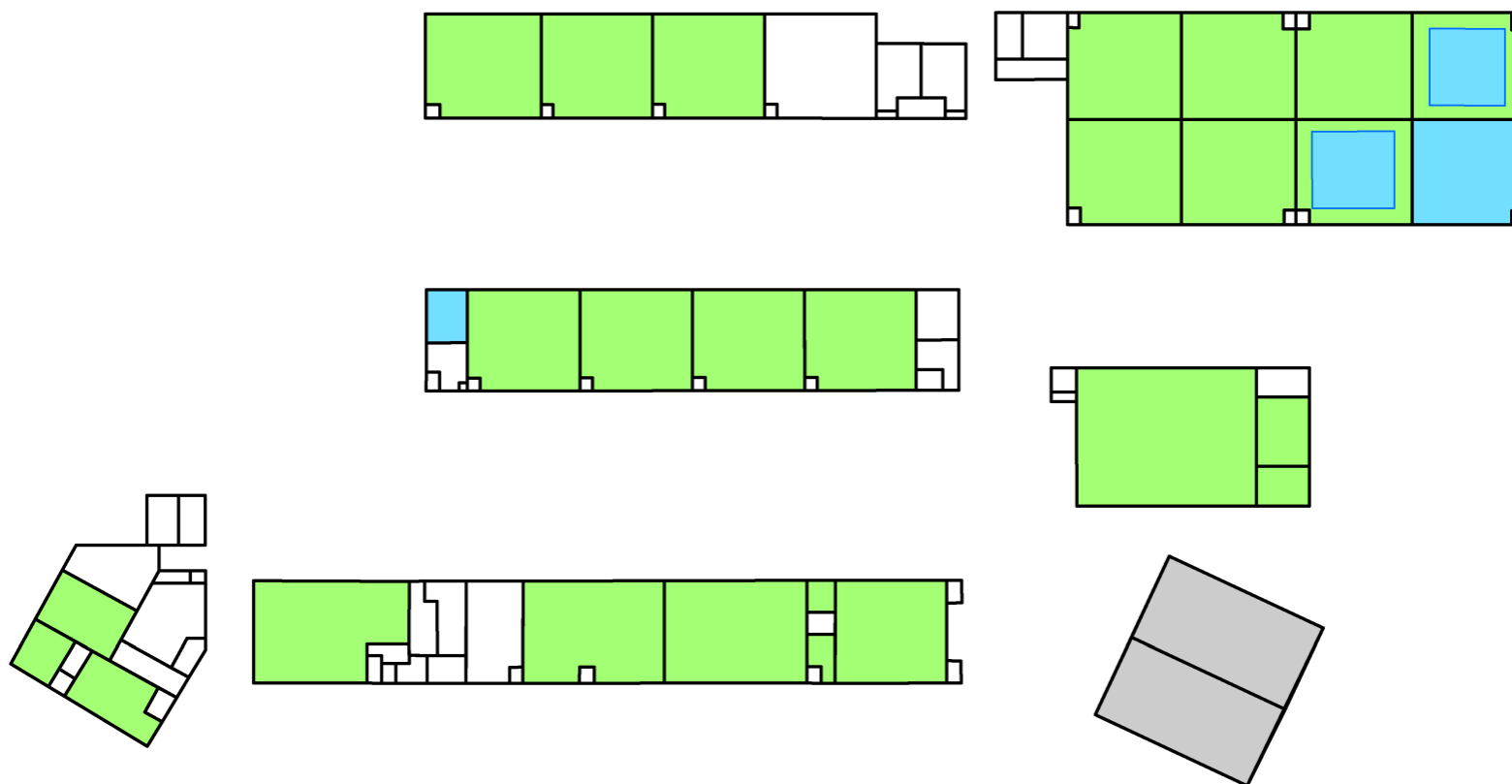


Indoor Air Sample Results



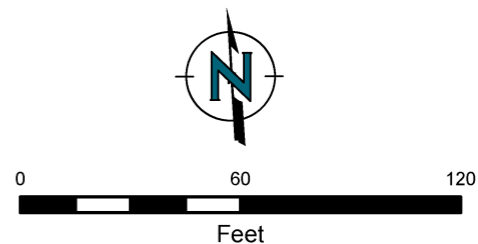


Indoor Air Sample Results



Juan Cabrillo Elementary School

- ND
- $\geq$ RL and $\leq$ USEPA Public Health Levels
- $>$ USEPA Public Health Levels





Key EPA School Policy Accomplishments at MHS/JCES (cont.)

- BMP cleaning was effective and frequency is more than sufficient
- Evidence of past ballasts leaks in old light fixtures
 - Given air results, past leak residues are not causing unsafe levels of PCBs in air
 - District is replacing old light fixtures
- Collectively, shows any potential sources can be safely managed in place until the next renovation or demolition



MHS/JCES is not like other examples cited in other venues

- All MHS/JCES exposure data collected to date indicate PCB exposures (air/dust) are within safe levels
 - Demonstrates that any potential sources in the schools are not contributing to unacceptable exposure levels
- This is different than East Coast Schools cited
 - Westport Middle (MA), Burke Elementary (MA), Clark Elementary (CT), Osborn Hill Elementary (CT)
 - Caulk sampling conducted as part of planned renovation/repairs
 - Air testing done after discovery of materials with > 50 ppm PCBs
 - Unlike MHS/JCES, some air tests at these schools were above USEPA's Public Health Levels for Schools



Hartford, CT Clark Elementary School

- **December 2014:** PCBs detected in paint samples (12 – 100 ppm) during pre-renovation building materials testing
 - Associated with renovation of fire protection system (sprinklers)
 - Required by CT Department of Education, Office of school Facilities (OSF) for projects seeking State reimbursement
- **December 19, 2014:** PCBs detected in air samples (194 to 223 ng/m³)
- **December - January 2015:** Consultant investigates other building materials to determine source of PCBs in air
 - PCBs detected in caulk (31,000 – 97,000 ppm)
 - PCBs detected in indoor air after several days of exchange (110 to 571 ng/m³)
 - Report published in March 2015
- **January 2015:** CT DPH says air is “way below a level that could cause health problems”
- **January 12, 2015:** Students relocated to other schools



Hartford, CT Clark Elementary School (cont.)

- **Next Steps/Coming Months:**
 - Additional sampling (soil, substrate, etc.) necessary to finalize PCB remediation plan and get EPA approval
 - Developing a pilot study to determine effective remediation techniques
 - Seek bids from PCB removal firms to prepare detailed cleanup plan for EPA approval
 - School superintendent estimated it could take more than a year before school can be re-occupied
 - Hartford Courant reported a “ballpark” figure of \$4M for remediation that could easily change
 - Goal is to “get air levels to an acceptable level” as quoted in Hartford Courant article



PCB Plan Moving Forward

- Summer Break 2015
 - Old light fixture replacement (by August 14, 2015)
 - Caulk removal in 4 rooms and MHS library (by June 30, 2015)
 - Annual BMP cleaning
 - HVAC inspection/cleaning
 - PCB sampling – given results to date, smaller effort
 - Conclusion of Pilot Study – basis for future monitoring recommendations
 - Testing related to caulk removal activities
- Future ENVIRON activities at MHS/JCES
 - Reduced level of assistance
 - Areas potentially include future monitoring and District's ongoing implementation of Specific Plan



ENVIRON's Costs



PEA Investigation Costs

Laboratory Cost Per Sample: \$52 to \$775 (525 samples analyzed)

- 
- ← • Work Plans
 - ← • Pre-fieldwork planning
 - ← • Utility locating
 - ← • Soil, soil gas, and groundwater sampling
 - ← • Surveying
 - ← • Expedited third party data validation
 - ← • QA/QC
 - ← • Data management
 - ← • Waste disposal
 - ← • Site repairs
 - ← • Communication with DTSC and community
 - ← • Other direct expenses (supplies, equip. rental)
 - ← • ENVIRON data analysis
 - ← • Data transmittals and documentation
 - ← • PEA Report

Total Cost Per Sample: \$1,700 to \$2,400



PCB Summer Investigation Costs

Laboratory Expedited Cost Per Sample (198 air; 548 surface wipes):

- Air \$228
- Surface Wipes \$130



- ← Planning and SMMUSD coordination
- ← Communications with regulatory agencies
- ← Room/Building inspections
- ← Collection of air and surface wipe samples
- ← Other direct expenses (e.g., shipping, supplies, equip. rental)
- ← Third party data validation
- ← ENVIRON data analysis
- ← Reports and documentation
- ← QA/QC

Total Cost Per Sample:

- Air ~\$1,600
- Surface Wipes ~\$1,500

To be done in 39 days of Summer school – all work expedited



ENVIRON's MHS/JCES Investigation Efforts – Costs (including direct costs)

- Worked with the District to define scope/schedule of the efforts needed to accomplish District goals
 - Regular updates with the District on level of effort
- PEA
 - Investigation Work Plan: \$240k
 - Execution: \$850k
 - PEA Report: \$150K
 - RAW: \$175k
- Building Materials
 - Best Management Plans and EPA plans: \$160k
 - BMP Training: \$23k
 - Summer 2014 activities: \$1.1M
 - Winter 2014/2015 sampling: \$150k
- Communications and Meetings: \$377k



Costs of Building Material Remedial Options



EPA Involvement in Remediation

- EPA approval required at some project stages
- Prudent to seek EPA concurrence and peer review at many other project stages
- District/EPA communication builds transparency in the project
- Achieves District goal of seeking input from expert lead agencies
- EPA Region IX has requested to be kept informed and has provided comment on all work to date at key project milestones



Remediation Steps & EPA Involvement

- Implementation of Building Material Sampling Program
 - PCB Sampling Summary Report to EPA for review
- EPA and Public Stakeholder Involvement
 - Remediation Work Plan, under Bulk Product Waste removal, to EPA for their review and concurrence
- Abatement of PCB Building Materials
 - Notify EPA of changes in conditions or new information
- Post-Remediation Confirmatory Sampling
 - PCB Completion Report to EPA upon finishing work



PCB Remediation Options

Option A – Caulk

(Temporary Solution)

Remove caulk > 50
ppm PCBs

and

Encapsulate adjacent
contaminated
substrate (brick,
cement, wallboard,
etc.)

Option B – Caulk

(Permanent Solution)

Remove caulk > 50
ppm PCBs

and

Remove adjacent
contaminated
substrate material
containing > 1 ppm
PCBs

Option C

(PCB-free Solution)

Abate all PCB impacted
materials,

Demolish school
buildings constructed
pre-1981

and

Rebuild

Major Cost Drivers (Options A and B)

% of caulk > 50 ppm PCBs drives:

- Extent of remediation efforts
- Extent of consultant sampling efforts for characterization, oversight, and post-remediation confirmatory sampling
- Assumed 40% (reasonable case) and 100% (reasonable worst case)

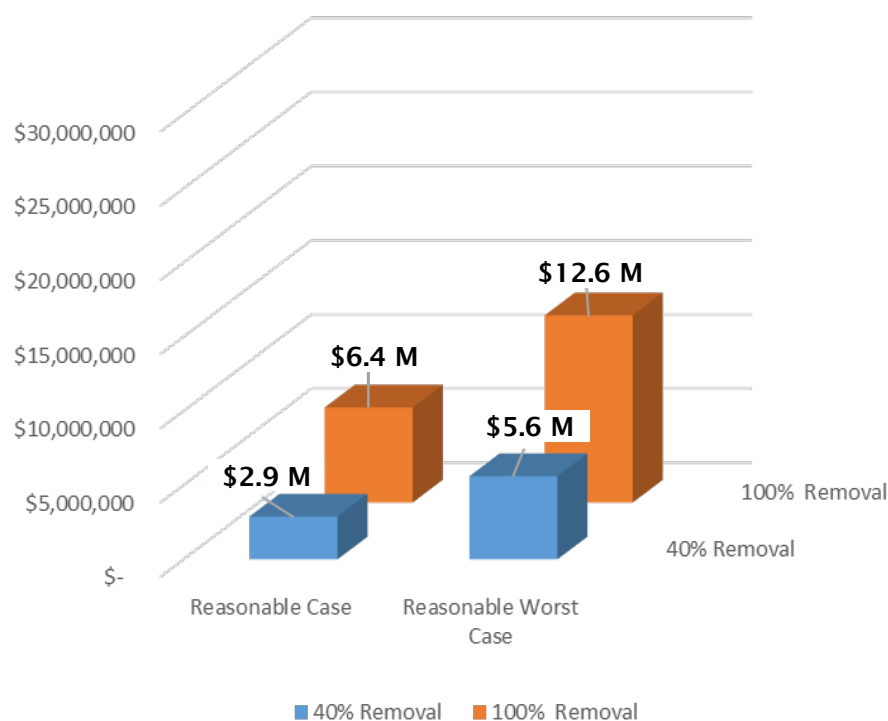
Major Cost Driver (Option C)

- Demolition and construction costs

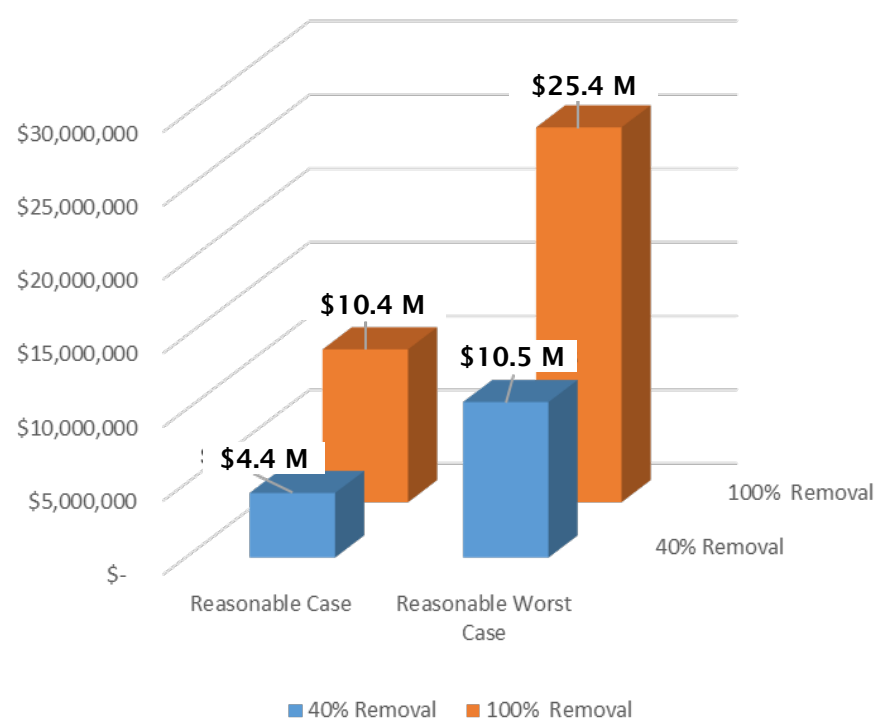


PCB Remediation Cost Estimates MHS/JCES – Options A/B for Caulk

Caulk Removal & Substrate Encapsulation

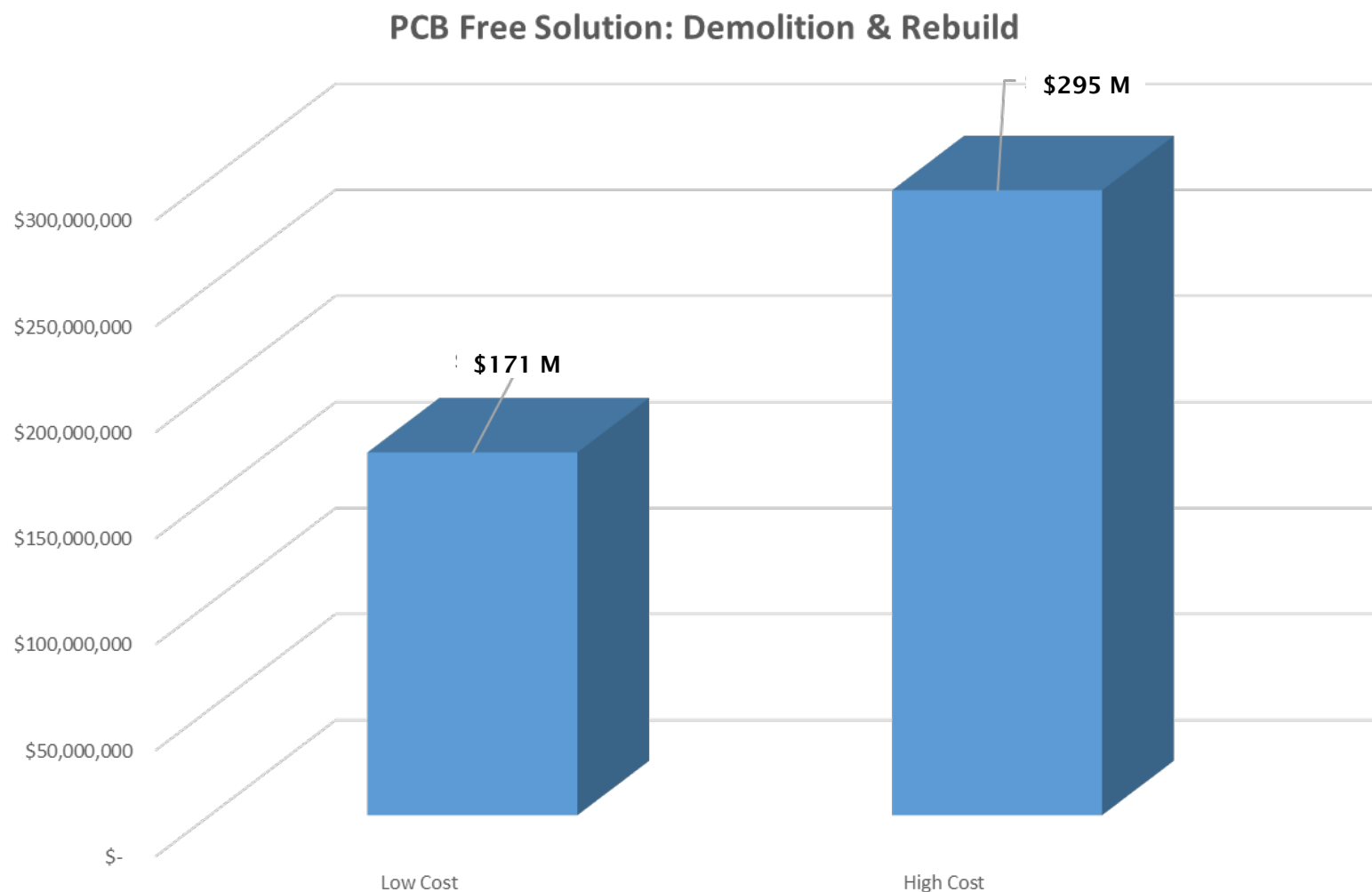


Caulk & Substrate Removal



PCB Remediation Cost Estimates

MHS/JCES – Option C for PCB-free Solution





Reference PCB Remediation Cost Estimates from other Schools¹

- All had air concentrations above EPA Public Health Levels for Schools
- Five Public Schools/New York City (WDOE, 2015)
 - Feasibility study evaluated caulk remedial/mitigation options
 - \$3.2M to \$3.6M per school (abatement/mitigation)
- Elementary School/Lexington, MA (Goddard, 2010; Parker 2014)
 - Estimated \$2.8 to \$4.2 million to relocate students during remediation
 - Officials decided to replace the school at a cost of \$33M to \$40M
- Westport, MA School (CGKV Architects, 2013)
 - Costs of initial 2011 Source Removal Project = \$3.2 million
 - Feasibility study recommended the following sustainable solution:
 - Mandatory removal of remaining PCB Source Material = \$1.6M;
 - Limited removal & encapsulation of known PCB Remediation Waste = \$4.4M; and
 - Remediation of unconfirmed PCB Remediation Waste = \$1.75M - \$2.1M (encapsulation versus removal)



Summary

- PEA
 - Results are acceptable for school uses
 - Land can be used for any purpose
- Building Materials
 - EPA made finding that there is no unreasonable risk at MHS or JCES
 - Collected data show that any potential sources can be safely managed in place until the next renovation or demolition while protecting public health & EPA agrees
 - Have EPA approved plan under TSCA
 - Removal scheduled (June) for MHS Library, 3 rooms in Building E and woodshop



Thank you



Region IX Benchmarks

- Air benchmarks protect students and teachers
 - Accounts for exposure in schools and background
 - Used nationally in schools

3-<6 yr	6-<12 years Elementary	12-<15 years Middle	15-<19 years High	19+ years Adult
100 ng/m ³	300 ng/m ³	450 ng/m ³	600 ng/m ³	450 ng/m ³

- Surface benchmark 1 ug/100 cm²
 - More protective than the 10 ug/100 cm² required under TSCA and frequently applied
- Air and wipe benchmarks are protective of cancer and non-cancer endpoints

<http://www.epa.gov/pcbsincaulk/maxconcentrations.htm>